

THE ZOOLOGICAL RECORD.

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THE
ZOOLOGICAL RECORD

FOR 1886;

BEING

VOLUME THE TWENTY-THIRD

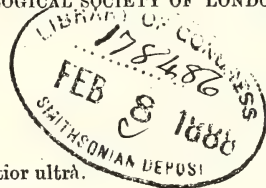
OF THE

RECORD OF ZOOLOGICAL LITERATURE.

EDITED BY

FRANK E. BEDDARD, M.A., F.Z.S.,

PROSECTOR AND DAVIS LECTURER TO THE ZOOLOGICAL SOCIETY OF LONDON.



Explorate solum : sic fit via certior ultra.

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PREFACE.

As is well known to most of the subscribers to the ZOOLOGICAL RECORD, the publication of the annual volume during the past sixteen years has been carried on by the Zoological Record Association, with the assistance of grants from the Government Fund of the Royal Society, from the British Association, and for some years (1871-1881) from this Society. At the close of last year the Zoological Record Association, having been unsuccessful in obtaining the renewal of some of these grants, and being unwilling to carry on the publication of the RECORD any longer, agreed to transfer the whole of their stock of the issued volumes of the RECORD to this Society upon certain terms, and upon the understanding that the Society would undertake its future publication. This the Council of the Society, being fully aware of the value of the RECORD to working zoologists, and being most unwilling that after the issue of twenty-two volumes it should come to an abrupt termination, have thought themselves fully justified in acceding to.

To superintend the publication of the ZOOLOGICAL RECORD for the future, the Council have deemed it advisable to appoint a Select Committee of their own members, consisting for the present year of the following gentlemen:—Mr. W. T. Blanford, F.R.S., Dr.

Günther, F.R.S., Professor Newton, F.R.S., Mr. Henry Pollock, Mr. Howard Saunders, and the President and Secretary. The Committee selected Mr. F. E. Beddard, the Prosector of the Society, as the Editor of the RECORD, and, as will be seen, have resolved to continue its publication, with but very slight alterations, in the manner in which it was previously carried on.

P. L. SCLATER,

Secretary.

ZOOLOGICAL SOCIETY OF LONDON,
3, HANOVER SQUARE, LONDON, W.

1st December, 1887.

EDITOR'S PREFACE.

THE only change which has been made in the present volume of the RECORD is the introduction of a section devoted to General Subjects. This includes text-books and works of a general nature, which it has been thought advisable to record in this way. Many of these books and papers are again recorded under the several groups with which they are more especially concerned.

The list of Zoological Periodicals has been revised and enlarged. I am indebted to Dr. G. H. Fowler and to Mr. W. L. Sclater for help in this work. I also desire to express my thanks to Mr. B. B. Woodward, of the General Library, Natural History Museum, for much kind assistance.

FRANK E. BEDDARD.

Communications, Papers, and Memoirs intended for this work should be addressed *solely* to "THE EDITOR of the Zoological Record, Zoological Gardens, Regent's Park, London, N.W." It is earnestly requested that in the case of separately-printed copies of papers so forwarded, the *original pagination* be indicated.

LIST OF THE
PRINCIPAL ABBREVIATED TITLES OF JOURNALS, &c.,
CONSULTED BY THE RECORDERS.

- Abh. Ak. Berl.*—Abhandlungen der königlich Akademie der Wissenschaften zu Berlin. (Also *SB.*)
- Abh. bayer. Ak.*—Abhandlungen der mathematisch physikalischen Classe der k. bayerischen Akademie der Wissenschaften (Munich). (Also *SB.*)
- Abh. böhm. Ges.*—Abhandlungen der k. böhmischen Gesellschaft der Wissenschaften (Prague). (Also *SB.*)
- Abh. Ges. Götting.*—Abhandlungen der k. Gesellschaft der Wissenschaften zu Göttingen.
- Abh. Ges. Halle*—Abhandlungen der naturforschenden Gesellschaft in Halle. (Also *Ber.*)
- Abh. Ges. Hamb.*—Abhandlungen aus dem Gebiete der Naturwissenschaften herausgegeben vom naturw. Verein in Hamburg.
- Abh. Ges. Isis*—Abhandlungen der naturwissenschaftlichen Gesellschaft 'Isis' in Dresden. (See *SB.*)
- Abh. Ges. Königsb.*—Abhandlungen der k. physikalisch-ökonomischen Gesellschaft in Preussen (Königsberg). (Also *SB.*)
- **Abh. naturh. Gesells. Nürnberg*—Abhandlungen der naturhistorischen Gesellschaft zu Nürnberg. (See *JB.*)
- Abh. sächs. Ges.*—Abhandlungen der k. sächsischen Gesellschaft der Wissenschaften (Leipzig). (Also *Ber.*)
- **Abh. Schles. Ges.*—Abhandlungen der Schlesischen Gesellschaft f. vaterländische cultur (Breslau). (Also *JB.*)
- Abh. schw. pal. Ges.*—Abhandlungen der schweizerischen paläontographischen Gesellschaft (Bâle).
- Abh. Senck. Ges.*—Abhandlungen herausgegeben von der Senckenbergischen naturforschenden Gesellschaft (Frankfort). (Also *Ber.*)
- Abh. Ver. Brem.*—Abhandlungen herausgegeben vom naturwissenschaftlichen Verein zu Bremen.
- Act. Ac. Bordeaux*—Actes de l'Académie nationale des sciences belles lettres et Arts de Bordeaux.
- Act. Ac. Cordob.*—Actas de la Academia Nacional de Ciencias de la republica Argentina en Córdoba (Buenos Ayres).

* Those periodicals marked with an asterisk (*) are no longer published.

- Act. Lund.*—Acta Universitatis Lundensis (Lund). (Called also Lund's Universitets Årskrift.)
- Act. Soc. Fenn.*—Acta Societatis Scientiarum Fennicæ (Helsingfors).
- Act. Soc. Helv.*—Actes de la Société helvétique des Sciences naturelles (Called also Verhandl. d. schweiz. Naturforsch. Gesells.).
- Act. Soc. Jura.*—Actes de la Société Jurassienne d'émulation.
- Act. Soc. L. Bord. (4)*—Actes de la Société Linnéenne de Bordeaux. Quatrième série. (Also *Comptes rendus*.)
- Act. Upsala*—Acta Universitatis Upsalensis. (Called also Upsala Universitets Årskrift.)
- Aid*—C. O. Waterhouse's Aid to the Identification of Insects (Janson : London).
- Alb. Nat.*—Album der Natuur (Harting : Haarlem).
- Am. J. Sci. (3)*—American Journal of Science and Art. Third Series (New Haven).
- Am. Micr. J.*—American Monthly Microscopical Journal (Hitchcock : Washington).
- Am. Nat.*—American Naturalist (Philadelphia).
- Anat. Anz.*—Anatomische Anzeiger (Bardleben : Jena).
- An. Mus. B. Aires*—Anales del Museo publico, Buenos Aires.
- An. Mus. nac. Mexico*—Anales del Museo nacional de México.
- Ann. Acc. asper. Nat.*—Annali dell' Accademia degli aspiranti Naturalisti (Napoli).
- Ann. Ent. Belg.*—Annales de la Société Entomologique de Belgique (Brussels).
- Ann. Hofmuseum Wien*—Annalen des k. k. naturhistorischen Hofmuseum (Wien).
- Ann. Lomb. Venet.*—Annali di Scienze del regno Lombardo-Venetiano.
- Ann. Mal.*—Annales de Malacologie (Servain : Paris).
- Ann. Mus. Belg.*—Annales du Musée royal d'histoire naturelle Belgique (Brussels).
- Ann. Mus. Genov. (2)*—Annali del Museo civico di Storia Naturale di Genova (Genoa).
- Ann. Mus. Marseille*—Annales du Musée d'Histoire Naturelle de Marseille. Zoologie (Marion : Marseilles).
- Ann. N. H. (5)*—Annals and Magazine of Natural History. Fifth series (London).
- Ann. N. York Ac.*—Annals of the New York Academy of Sciences.
- Ann. Sci. géol.*—Annales des Sciences géologiques (Hébert & Milne-Edwards : Paris).
- Ann. Sci. Nat. (6)*—Annales des Sciences Naturelles. 6me série (Paris).
- Ann. Soc. Agric. Lyon*—Annales de la Société d'Agriculture, Histoire Naturelle, et Arts utiles de Lyon (Lyons & Paris).
- Ann. Soc. Brux.*—Annales de la Société scientifique de Bruxelles (Brussels).
- Ann. Soc. Char.*—Annales de la Société des Sciences Naturelles de Charente Inférieure (= Academie de la Rochelle).

- Ann. Soc. Ent. Fr.* (6)—Annales de la Société entomologique de France. 6me série (Paris).
- An. Soc. Esp.*—Anales de la Sociedad Española de Historia Natural (Madrid).
- Ann. Soc. géol. Nord*—Annales de la Société géologique du Nord (Lille). (Also *Memoires.*)
- Ann. Soc. L. Lyon* (n.s.)—Annales de la Société Linnéenne de Lyon. Nouvelle série.
- Ann. Soc. mal. Belg.*—Annales de la Société malacologique de Belgique (Brussels).
- Ann. Soc. Mod.* (2)—Annuario della Società dei Naturalisti di Modena. (See *Atti.*)
- Ann. Univ. Toscane*—Annali delle Università Toscane (Pisa).
- An. Soc. Arg.*—Anales de la Sociedad científica Argentina (Buenos Aires).
- Anz. Ak. Wien*—Anzeiger der mathematisch-naturwissenschaftlichen Classe der K. Akademie der Wissenschaften zu Wien (Vienna).
- Arb. Inst. Würzb.*—Arbeiten aus dem zoologisch-zootomischen Institut in Würzburg.
- Arb. z. Inst. Wien*—Arbeiten aus dem zoologischen Institute der Universität Wien (Vienna).
- Arb. z. Inst. Graz*—Arbeiten aus dem zoologischen Institut zu Graz (Leipsic).
- Arch. Anat. I. hys.*—Archiv für Anatomie und Physiologie (His, Braune, & Du Bois Reymond: Leipzig).
- Arch. Biol.*—Archives de Biologie (Van Beneden & Van Bambeke: Ghent).
- Arch. f. Anthropol.*—Archiv für Anthropologie: Zeitschrift für Naturgeschichte und Urgeschichte des Menschen (Brunswick).
- Arch. f. Nat.* (2)—Archiv für Naturgeschichte. Neue Folge (Berlin).
- Arch. f. Thierheilk.*—Archiv für Thierheilkunde.
- Arch. ges. Phys.*—Archiv für die gesammte Physiologie des Menschen und der Thiere (Pflüger: Bonn).
- Arch. Ital. Biol.*—Archives Italiennes de Biologie; Revues, Résumés, Reproductions des travaux scientifiques Italiens (Emery & Mosso: Turin).
- Arch. mikr. Anat.*—Archiv für mikroskopische Anatomie (Bonn).
- Arch. Miss. sci.*—Archives des Missions scientifiques et littéraires (Paris).
- Arch. Mus. Lyon*—Archives du Muséum d'Histoire Naturelle de Lyon.
- Arch. Mus. B. Jan.*—Archivos do Museu Nacional do Rio de Janeiro.
- Arch. Mus. Teyl.*—Archives du Musée Teyler (Haarlem).
- Arch. Nat. Liv.*—Archiv für die Naturkunde Liv-, Esth-, und Kurlands (Dorpat).
- Arch. naturw. landesforsch. Böhmen*—Archiv für naturwissenschaftliche Landesdurchforschung von Böhmen (Prag).
- Arch. Néerl.*—Archives Néerlandaises des Sciences exactes et naturelles (Bosscha: Haarlem).

- Arch. Phys.*—Archives de Physiologie normale et pathologique (Brown-Séquard : Paris).
- Arch. Sci. nat.*—Archives des Sciences physiques et naturelles (Geneva).
- Arch. slav. Biol.*—Archives slaves de Biologie (Mendelssohn-Richet : Paris).
- Arch. Ver. Mecklenb.*—Archiv des Vereins der Freunde der Naturgeschichte in Mecklenburg.
- Arch. Zeeuw. Genoots. Wetensch.*—Archief Vroegue en latere Mededeelingen voornaamalijk in Betrekking tot Zeeland uitgegeven doorhet Zeeuwosch Genootschap der wetenschappen (Middelburg).
- Arch. Z. expér.*—Archives de Zoologie expérimentale et générale (Paris).
- Atti Acc. Gioen.*—Atti dell' Accademia Gioenia di Scienze naturali (Catania).
- Atti Ac. Napoli*—Atti della R. Accademia delle scienze fisiche o matematiche.
- Atti Ac. Palermo*—Atti della R. Accademia di scienze, lettere e belle arti di Palermo (Palermo).
- Atti Ac. Pontaniana*—Atti dell' Accademia Pontaniana (Naples).
- Atti Ac. Pontif. Lincei*—Atti dell' Accademia Pontificia de' nuovi Lincei.
- Atti Acc. Tor.*—Atti della R. Accademia delle Scienze di Torino (Turin).
- Atti Ist. Nap.*—Atti del R. Istituto d'incoraggiamento alle Scienze Naturali economiche e tecnologiche, &c., di Napoli (Naples).
- Atti Ist. Venet.*—Atti del R. Istituto Veneto di scienze, lettere ed arti, &c. (Venice).
- Atti (Mem.) Soc. Tosc.*—Atti (Memorie) della Società Toscana di Scienze naturali residente in Pisa.
- Atti (Mem. Tras. Rend.) Acc. Rom.*—Atti (Memorie Trasunti Rendiconti) della R. Accademia dei Lincei (Rome).
- Atti Mus. Civico Trieste*—Atti del Museo civico di Storia Naturale di Trieste.
- Atti (Rend. Mem.) Soc. Mod. Mem.*—Atti (Memorie Rendiconti) della Società dei Naturalisti di Modena.
- Atti Soc. Ital.*—Atti della Società Italiana di Scienze naturali (Milan).
- Atti Soc. Ven.-Trent.*—Atti della Società Veneto-Trentina di Scienze naturali residente in Padova (Padua).
- Atti Univ. Genova*—Atti della R. università di Genova.
- Auk*—The Auk. A Quarterly Journal of Ornithology. (Continuation of the Bulletin of the Nuttall Ornithological Club.)
- Ausland*—Das Ausland (Stuttgart).
- Beitr. Morphol. Morphog.*—Beiträge zur Morphologie und Morphogenie (Gerlach : Stuttgart).
- Beitr. Pal. Oesterr.-Ung.*—Beiträge zur Paläontologie Oesterreich-Ungarn's und des Orients (Mojisovics & Neumayr : Vienna).
- Beitr. Russ. Reiches* (2)—Beiträge zur Kenntniss des Russischen Reiches und der angrenzenden Länder Asiens. Neue Folge (Schrenck & Maximowics : St. Petersburg).
- Ber. Comm. wiss. Unters. deutsch. Meere*—Bericht der Commission zur Untersuchung der deutschen Meere.

- Ber. Freiburg Ges.*—Berichte der naturforschenden Gesellschaft zu Freiburg (Freiburg, i Br.).
- Bergens Mus. Aarsber.*—Bergens Museum Aarsberetning (Bergen).
- Ber. Ges. Chemn.*—Bericht der naturwissenschaftlichen Gesellschaft zu Chemnitz.
- Ber. Ges. Halle*—Bericht über die Sitzungen der naturforschenden Gesellschaft zu Halle. (Also *Abhandl.*)
- Ber. Ges. Hanau* = *JB. wetter. Ges.*
- Ber. Ges. Leipzig*—Bericht ueber die Verhandlungen der königlichen Sächs. Gesellschaft der Wissenschaft in Leipzig. (Also *Abhandl.*)
- Ber. Naturf. Ärzte*—Ämtliche Bericht deutscher Naturforscher und Ärzte.
- Ber. naturf. Ges. Bamberg*—Bericht der naturforschenden Gesellschaft in Bamberg.
- Ber. Naturhist. Mus. Hamburg*—Bericht des Naturhistorischen Museums in Hamburg.
- Ber. natur. Ver. Passau*—Bericht des naturhistorischen Vereins in Passau.
- Ber. Oberhess. Ges.*—Bericht der Oberhessischen Gesellschaft für Natur- und Heilkunde (Giessen).
- Ber. Offenb. Ver.*—Bericht über die Thätigkeit des Offenbacher Vereins für Naturkunde (Offenbach-on-the-Main).
- Ber. Primärsch. Böhm.-Leipa*—Bericht der Primärschule in Böhmischem Leipa.
- Ber. Senck. Ges.*—Bericht der Senckenbergische naturforschende Gesellschaft im Frankfurt am Main. (Also *Abhandl.*)
- Ber. St. Gall. Gess.*—Bericht über die Thätigkeit der St. Gallischen naturwissenschaftlichen Gesellschaft (St. Gallen).
- Ber. Ver. Augsburg*—Bericht des naturhistorischen Vereins, Augsburg.
- Ber. Ver. Cassel*—Berichte des Vereins für Naturkunde zu Cassel.
- Ber. Ver. Fulda*—Bericht des Vereins für Naturkunde in Fulda.
- Berl. Monatsh.*—Berliner Monatshefte.
- B. E. Z.*—Berliner entomologische Zeitschrift.
- Bibl. haut. études*—Bibliothèque de l'école des hautes études. Section des Sciences Naturelles (Paris).
- Bibl. univ.*—Bibliothèque universelle et Revue Suisse (Geneva). (See *Arch. Sci. Nat.*)
- Bidr. Finl. Nat.*—Bidrag till Kännedom af Finlands Natur och Folk (Helsingfors).
- Bih. Sv. Ak. Handl.*—Bihang till K. Svenska Vetenskaps-Akademiens Handlingar (Stockholm).
- Bijdr. Dierk.*—Bijdragen tot de Dierkunde (Amsterdam).
- Bijdr. Taal-, &c., Ned. Indië* (4)—Bijdragen tot de Taal-, Land-, en Volkenkunde van Nederlandsch Indië. 4^{de} Volgreeks (The Hague).
- Biol. Centralbl.*—Biologisches Centralblatt (Rosenthal: Erlangen).
- Bol. Ac. Arg.*—Boletín de la Academia Nacional de Ciencias de la Republica Argentina (Cordoba).
- Boll. Mus. Zool. Anat. Comp. Torino*—Bollettino dei Musei di Zoologia ed Anatomia comparata della R. Università di Torino.

- Boll. scient.* — Bollettino scientifico (Maggi, Zoja, & Giovanni : Pavia).
- Boll. Soc. Adr.* — Bollettino della Società Adriatica di Scienze naturali (Trieste).
- Bot. Centralbl.* — Botanisches Centralblatt. Referentes-Organ für das Gesamtgebiet der Botanik des In- und Auslandes (Uhlwein & Behrens : Cassel).
- Bot. Z.* — Botanische Zeitung (Halle).
- Brit. Med. J.* — British Medical Journal (London).
- Bull. Ac. Belg.* (3) — Bulletin de l'Académie Royale des Sciences, des lettres, et des Beaux Arts de Belgique. 3me série (Brussels). (Also *Mem.*)
- Bull. Am. Mus. Nat. Hist.* — Bulletin of the American Museum of Natural History (New York).
- ° *Bull. Brooklyn Soc.* — Bulletin of the Brooklyn Entomological Society (New York).
- Bull. Brookville Soc.* — Bulletin of the Brookville Society of Natural History (Brookville, Indiana, U.S.A.).
- Bull. Buff. Nat. Club* — Bulletin of the Buffalo Naturalists' Club (Buffalo, N.Y.).
- Bull. Cal. Ac. Sci.* — Bulletin of the California Academy of Sciences (San Francisco).
- Bull. Denison Univ.* — Bulletin of the Scientific Laboratories of Denison University (Granville, Ohio).
- Bull. Dep. Agric. Ent.* — U.S. Department of Agriculture. Division of Entomology. Bulletin (Washington).
- Bull. Des Moines Ac.* — Bulletin of the Des Moines Academy of Sciences (Des Moines, Iowa).
- Bull. Ent. Ital.* — Bollettino della Società Entomologia Italiana (Florence).
- Bull. Ess. Inst.* — Bulletin of the Essex Institute (Salem, U.S.A.).
- Bull. hebdom. Ass. sci. Fr.* — Bulletin hebdomadaire de l'Association scientifique de France.
- Bull. Illin. Lab. N. H.* — Illinois State Laboratory of Natural History. Bulletin (Normal, Illinois).
- Bull. Inst. Nat. Genevois* — Bulletin de l'institut nationale Genevois.
- Bull. Minnesota Acad.* — Bulletin of the Minnesota Academy of Natural Sciences.
- Bull. Mosc.* — Bulletin de la Société impériale des Naturalistes de Moscou.
- Bull. Mus. Belg.* — Bulletin du Musée Royal d'Histoire Naturelle de Belgique (Brussels).
- Bull. Mus. C. Z.* — Bulletin of the Museum of Comparative Zoology of Harvard College (Cambridge, U.S.A.).
- Bull. Pétersb.* — Bulletin de l'Académie Impériale des Sciences de St. Pétersbourg.
- Bull. Phil. Soc. Wash.* — Bulletin of the Philosophical Society of Washington.
- Bull. Sci. Nord.* — Bulletin scientifique du Nord de la France et de la Belgique (Giard : Paris).

- Bull. Sedalia Soc.*—Bulletin of the Sedalia Natural History Society (Sedalia, Mo.).
- Bull. Soc. Acclim.* (3)—Bulletin mensuel de la Société nationale d'Acclimatation de Paris. 3me série (Paris).
- Bull. Soc. Angers.*—Bulletin de la Société d'études scientifiques d'Angers (Angers).
- Bull. Soc. Anthropol. Lyon*—Bulletin de la Société d'Anthropologie de Lyon.
- Bull. Soc. Anthropol. Par.*—Bulletin de la Société d'Anthropologie de Paris.
- Bull. Soc. Belg. Micr.*—Bulletin de la Société Belge de Microscopie (Brussels).
- Bull. Soc. Béziers.*—Bulletin de la Société d'étude des Sciences naturelles de Béziers. Comptes rendus des Séances (Béziers).
- Bull. Soc. Colm.*—Bulletin de la Société d'Histoire naturelle de Colmar.
- Bull. Soc. Dinan*—Bulletin de la Société des Naturalistes Dinantais (Dinant).
- Bull. Soc. Ent. Fr.*—Bulletin des séances de la Société entomologique de France (Paris). (See *Ann.*)
- Bull. Soc. Finistère*—Bulletin de la Société d'études scientifiques du Finistère (Morlaix).
- Bull. Soc. Geogr.*—Bulletin de la Société de Géographie (Paris).
- Bull. Soc. géol.* (3)—Bulletin de la Société géologique de France. 3me série (Paris).
- Bull. Soc. L. Bruxelles*—Bulletin de la Société Royale Linnéenne de Bruxelles.
- Bull. Soc. L. Nord France*—Bulletin de la Société Linnéenne du Nord de la France (Amiens).
- Bull. Soc. L. Norm.* (3)—Bulletin de la Société Linnéenne de Normandie. Troisième série (Caen).
- Bull. Soc. mal. Fr.*—Bulletin de la Société malacologique de France (Paris).
- Bull. Soc. mal. Ital.*—Bullettino della Società malacologica Italiana (Pisa).
- Bull. Soc. Metz* (2)—Bulletin de la Société d'histoire naturelle de Metz (formerly du Département de la Moselle).
- Bull. Soc. Murith.*—Bulletin des travaux de la Société Murithienne du Valais (Neuchâtel).
- Bull. Soc. Nancy*—Bulletin de la Société des Sciences de Nancy (Paris).
- Bull. Soc. Neuchatel*—Bulletin de la Société des sciences naturelles de Neuchatel.
- Bull. Soc. Philom.*—Bulletin de la Société Philomathique de Paris.
- Bull. Soc. Rouen*—Bulletin de la Société des Amis des Sciences Naturelles de Rouen (Rouen).
- Bull. Soc. Sarthe*—Bulletin de la Société d'Agriculture, des Sciences, &c., de la Sarthe (Le Mans).
- Bull. Soc. Saone*—Bulletins de la Société des sciences naturelles de Saone-et-Loire (Chalons sur Saone). (Also *Mem.*)
- Bull. Soc. Savoie*—[Bulletin de la] Société d'histoire naturelle de Savoie (Annecy).

- Bull. Soc. Sci. Phys. Nat. Toulouse*—Bulletin de la Société des sciences physiques et naturelles de Toulouse (Toulouse).
- Bull. Soc. Sud-Est*—Bulletin de la Société des Sciences naturelles du Sud-East (Grenoble).
- Bull. Soc. Toulouse*—Bulletin de la Société d'Histoire Naturelle de Toulouse.
- Bull. Soc. Vaud.*—Bulletin de la Société Vaudoise des Sciences Naturelles (Lausanne).
- Bull. Soc. Ven.-Trent.*—Bullettino della Società Veneto-Trentina di Scienze naturali (Padua).
- Bull. Soc. Yonne*—Bulletin de la Société des Sciences historiques et naturelles de l'Yonne (Auxerre).
- Bull. Soc. Z. Fr.*—Bulletin de la Société Zoologique de France (Paris).
- Bull. U. S. Fish Comm.*—Bulletin of the United States Fish Commission (Washington).
- Bull. U. S. Geol. Surv.*—Bulletin of the United States Geological and Geographical Survey of the Territories (Washington).
- Bull. U. S. Nat. Mus.*—Bulletin of the United States National Museum (Washington).
- Bull. Washb. Coll.*—Bulletin of the Washburn College Laboratory of Natural History (Topeka, Kansas).
- Canad. Ent.*—Canadian Entomologist (Saunders : Montreal).
- **Canad. Nat. (n.s.)*—The Canadian Naturalist and Quarterly Journal of Science. New series (Montreal).
- Can. Rec.*—Canadian Record of Science.
- Cardiff Nat. Soc.*—Cardiff Naturalists' Society. Report and Transactions (Cardiff).
- CB. Ges. Anthropol.*—Correspondenzblatt der Deutschen Gesellschaft für Anthropologie, &c. (Brunswick).
- CB. Iris*—Correspondenz-Blatt des Entomologischen Vereins Iris zu Dresden.
- CB. med. Wiss.*—Centralblatt für die medicinischen Wissenschaften (Berlin).
- CB. Ver. Regensb.*—Correspondenz-Blatt des naturwissenschaftlichen Vereins in Regensburg (Ratisbon).
- CB. Ver. Rheinl.*—Correspondenz-Blatt des naturhistorischen Vereins der preussischen Rheinlande und Westphalens (Bonn). (Also *Verh. & SB.*)
- CB. Ver. Riga*—Correspondenzblatt des Naturforscher Vereins zu Riga.
- Cellule*—La Cellule. Recueil de Cytologie et d'histologie générale (Carnoy, Gilson, & Denys : Lierre & Gand).
- Chrysanthemum*—The Chrysanthemum : a Monthly Magazine for Japan and the Far East (Yokohama).
- Circ. deutsch. Fisch. Ver.*—Circular des deutschen Fischerei-Vereins (Berlin).
- Cist. Ent.*—Cistula Entomologica (Janson : London).
- Comm. Acc. Petersb.*—Commentarii Academiæ scientiarum imperialis Petropolitanae (St. Petersburg).

- Comm. Ateneo Brescia*.—Commentari dell' Ateneo di Brescia.
- Conch. Mittheil.*.—Conchologische Mittheilungen (Martens: Cassel).
- **Congr. Sc.*.—Congrès Scientifique de France. (1833-79.)
- Contr. E. M. Mus. Geol. Princeton*.—Contributions from the E. M. Museum of Geology, Princeton College, U. S. A. (Scott & Osborn).
- C.R.*.—Comptes rendus des Séances hebdomadaires de l'Académie des Sciences (Paris).
- C.R. Ass. Fr. Sci.*.—Compte-rendu de l'Association Française pour l'avancement des Sciences.
- C.R. ent. Belg.*.—Comptes rendus des Séances de la Société entomologique de Belgique (Brussels).
- C.R. Soc. Biol. (8)*.—Comptes rendus hebdomadaires des Séances et Mémoires de la Société de Biologie. 8me série (Paris).
- Dan. Selsk. Skr.*.—K. Danske Videnskaberne Selskabs Skrifter (Copenhagen).
- Denk. Ak. Wien.*.—Denkschriften der k. Akademie der Wissenschaften zu Wien (Vienna). (Also *SB.*)
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- P. Birmingh. Phil. Soc.*—Proceedings of the Birmingham Philosophical Society.
- P. Birmingh. Soc.*—(See *Report*).
- P. Bost. Soc.*—Proceedings of the Boston Society of Natural History (Boston, U.S.A.).
- P. Bristol Soc.*—Proceedings of the Bristol Naturalists' Society.
- P. Cambr. Phil. Soc.*—Proceedings of the Philosophical Society, Cambridge.
- P. Canad. Inst.*—Proceedings of the Canadian Institute (Toronto).
- P. Chest. Soc.*—Proceedings of the Chester Society of Natural Science.
- P. Cottesw. Nat. F. C.*—Proceedings of the Cotteswold Naturalists' Field Club (Gloucester).
- P. Davenport Ac.*—Proceedings of the Davenport Academy of Natural Sciences (Davenport, Iowa).
- P. Dorset Field Club*—Proceedings of the Dorset Natural History and Antiquarian Field Club (Sherborne).
- P. E. Soc.*—Proceedings of the Entomological Society of London.
- P. Folkestone Soc.*—Proceedings of the Folkestone Natural History Society.
- P. Geol. Ass.*—Proceedings of the Geologists' Association (London).
- Phil. Tr.*—Philosophical Transactions of the Royal Society (London).
- P. Holmsdale Nat. Hist. Club*—Proceedings of the Holmsdale Natural History Club (London).
- P. Linn. Soc. N.S.W.*—Proceedings of the Linnean Society of New South Wales (Sydney).

- P. Liverp. Field Club*.—Proceedings of the Liverpool Naturalists' Field Club.
- P. Liverp. Soc.*.—Proceedings of the Literary and Philosophical Society of Liverpool.
- P. Manch. Soc.*.—(See *Mem.*)
- P. Nebraska Ass.*.—Proceedings of the Nebraska Association for the Advancement of Science.
- P. N. H. Soc. Glasg. (n.s.)*.—Proceedings of the Natural History Society of Glasgow.
- P. N.-Scot. Inst.*.—Proceedings and Transactions of the Nova-Scotian Institute of Natural Sciences (Halifax, N.-S.).
- P. Perthsh. Soc.*.—Proceedings of the Perthshire Society of Natural Science (Perth).
- P. Phil. Soc. Glasg.*.—Proceedings of the Philosophical Society of Glasgow.
- P. Phys. Soc. Edinb.*.—Proceedings of the Royal Physical Society of Edinburgh.
- Preisschr. Jablonovsk. Gesells. Leipsic*.—Preisschriften gekrönt und herausgegeben von der fürstlich Jablonovski'schen Gesellschaft zu Leipsig.
- P. R. Inst.*.—Proceedings of the Royal Institution of Great Britain (London).
- P. R. Irish Ac.*.—Proceedings of the Royal Irish Academy (Dublin).
- Prodr. Zool. Vict.*.—Prodromus of the Zoology of Victoria (McCoy: Melbourne).
- Protok. nat. Ges. Kazan*.—Protokol der naturforschenden Gesellschaft, Kazan.
- Prot. Soc. Nouv. Russ.*.—Protocol de la Société des Naturalistes de la Nouvelle Russie (Odessa).
- P. R. Soc.*.—Proceedings of the Royal Society (London).
- P. R. Soc. Edinb.*.—Proceedings of the Royal Society of Edinburgh.
- P. R. Soc. Queensl.*.—Proceedings of the Royal Society of Queensland (Brisbane).
- P. R. Soc. Tasm.*.—Papers and Proceedings and Reports of the Royal Society of Tasmania (Hobart).
- P. R. Soc. Vict.*.—Proceedings of the Royal Society of Victoria (Melbourne).
- P. Somerset Soc.*.—Proceedings of the Somersetshire Archæological and Natural History Society. New series (Taunton).
- Psyche*.—Psyche, a Journal of Entomology. Published by the Cambridge Entomological Club (Cambridge, Mass., U.S.A.).
- P. Tr. Croydon Nat. Hist. Club*.—Proceedings and Transactions of the Croydon Microscopical and Natural History Club (Croydon).
- Publ. Inst. Luxemb.*.—Publications de l'Institut royal grand-ducal de Luxembourg.
- P. U. S. Nat. Mus.*.—Proceedings of the United States National Museum (Washington).
- P.-v. Soc. mal. Belg.*.—Procès-verbaux des séances de la Société malacologique de Belgique (Brussels).

P.-v. Soc. Tosc.—Processi verbali della Società Toscana di Scienze naturali (Pisa).

P. Warwick. Club—Proceedings of the Warwickshire Naturalists' and Archæologists' Field Club (Warwick).

P. Z. S.—Proceedings of the Zoological Society (London).

Q. J. Geol. Soc.—Quarterly Journal of the Geological Society (London).

Q. J. Micr. Sci.—Quarterly Journal of Microscopical Science (Lankester et alii : London).

Rad jugoslav. akad.—Rad jugoslavenske akademije znanosti i umjetnosti (Zagreb). [Transactions of the South Slav Academy of Science and Art.]

Rec. Geol. Surv. Ind.—Records of the Geological Survey of India (Calcutta).

Rec. Vénus—Recueil de Mémoires, Rapports et Documents relatifs à l'observation de Passage de Vénus sur le Soleil (Paris).

Rec. Z. Suisse—Recueil Zoologique Suisse (Fôl : Geneva & Bâle).

Rend. Acc. Nap.—Rendiconto dell' Accademia delle Scienze fisiche e matematiche (Sezione della Società reale di Napoli).

Rend. Ist. Bologna—Rendiconti delle sessioni della R. Accademia delle scienze dell' Istituto di Bologna.

Rend. Ist. Lombardo—Rendiconti del Real Istituto Lombardo di Scienze e letteri (Milan).

Rep. Belfast. N. H. Club—Reports of the Belfast Natural History Field Club.

Rep. Birm. N. H. Soc.—Report [and Transactions] of the Birmingham Natural History and Microscopical Society.

Rep. Brighton Soc.—Annual Report and Abstract of Proceedings of the Brighton and Sussex Natural History Society (Brighton).

Rep. Brit. Ass.—Report of the British Association for the Advancement of Science.

Rep. Cornell Univ. Stat.—Report of the Department of Entomology of the Cornell University Experiment Station (Comstock : Ithaca, N.Y.).

Rep. Cornwall Polytechn.—Reports of the Royal Polytechnical Society of Cornwall.

Rep. Dep. Agric. & Rep. Ent.—Report of the Entomologist. From the Annual Report of the Department of Agriculture (Washington).

Rep. Dulwich Coll. Soc.—Annual Report of the Dulwich College Science Society (Dulwich).

Rep. E. Soc. Ont.—Report of the Entomological Society of the Province of Ontario.

Rep. Geol. Serv. Canada—Report of the Geological and Natural History Survey and Museum of Canada (Montreal).

Rep. Ins. Illin.—Annual Report of the Noxious and Beneficial Insects of the State of Illinois (Springfield).

- Rep. Ins. N. York*.—Annual Report of the Injurious and other Insects of New York (Lintner : Albany).
- Rep. Leicest. Soc.*—(See *Tr.*)
- Rep. Marl. Coll. Soc.*—Report of the Marlborough College Natural History Society.
- Rep. N. Y. Mus.*—Annual Report on the New York State Museum of Natural History (Albany).
- Rep. Penzance Soc.*—Report and Transactions of the Penzance Natural History and Antiquarian Society.
- Rep. Plym. Inst.*—Annual Report and Transactions of the Plymouth Institution and Devon and Cornwall Natural History Society (Plymouth).
- Rep. Rugby Soc.*—Report of the Rugby School Natural History Society.
- Rep. Tr. Devon Ass.*—Report and Transactions of the Devonshire Association for the Advancement of Science, &c. (Plymouth).
- Rep. U. S. Ent. Comm.*—Report of the United States Entomological Commission (Washington).
- Rep. U. S. Fish Comm.*—Report of the Commissioner, United States Commission of Fish and Fisheries (Washington).
- Rep. U. S. Geol. Surv.*—Report of the United States Geological Survey (Washington).
- Rep. Wellington Soc.*—Report of the Wellington College Natural Science Society (Wellington Coll.).
- Rep. Winchester. Soc.*—Report of the Winchester College Natural History Society (Winchester).
- Rep. W. Kent Soc.*—Papers and Reports, &c., of the West Kent Natural History, Microscopical, and Photographic Society (Greenwich).
- Rev. Cien. Madrid*.—Revista de los progresos de las Ciencias exactas, físicas, y naturales (Madrid).
- Rev. d'Ent.*—Revue d'Entomologie, publié par la Société Française d'Entomologie (Fauvel : Caen).
- Rev. mens. Ent.*—Revue mensuelle d'Entomologie pure et appliquée (Doukhtouroff : St. Petersburg).
- Rev. Montp.*—Revue des Sciences naturelles (Montpellier).
- Rev. Quest. sci.*—Revue des Questions scientifiques (Brussels).
- Rev. Sci.*—Revue Scientifique de la France et de l'Étranger (Paris).
- Rev. Sci. Nat.*—Revue des Sciences Naturelles (Dubreuil : Paris).
- Rev. Soc. Porto*.—Revista da Societa de Instrução de Porto (Oporto).
- Rev. Tierheilkunde*.—Revue für Tierheilkunde und Tierzucht (Vienna).
- Rev. Tr. Sci.*—Revue des Travaux Scientifiques (Paris).
- Rev. Zool.*—Revue Zoologique.
- Rochester Nat.*—The Rochester Naturalist (Rochester).
- Rov. Lapok*.—Rovartani Lapok [Entomological Leaves] (G. Horváth : Budapest).
- Rozpraw Wydz. matem.-prz. Akad. Umiej.*—Rozpraw y i Sprawozdania z posiedzen Wydziału matem.-prz. Akademii Umiejetnosci. [Transactions of the Academy of Sciences, Krakau].

- SB. Ak. Berlin*—Sitzungsberichte der königlich preussischen Akademie der Wissenschaften zu Berlin (formerly Bericht and Monatsbericht). (Also *Abhandl.*)
- SB. Ak. Wien*—Sitzungsberichte der mathematische-naturwissenschaftlichen Classe der k. Akademie der Wissenschaften (Vienna). (Also *Denkschriften.*)
- SB. bayer. Ak.*—Sitzungsberichte der mathematisch-physikalischen Classe der k. bayerischen Akademie der Wissenschaften (Munich). (Also *Abhandl.*)
- SB. böhm. Ges.*—Sitzungsberichte der k. böhmischen Gesellschaft der Wissenschaften (Prague). (Also *Abhandl.*)
- SB. Ges. Dorp.*—Sitzungsberichte der Naturforscher Gesellschaft bei der Universität Dorpat (Dragendorff: Dorpat).
- SB. Ges. Isis*—Sitzungsberichte und Abhandlungen der naturwissenschaftlichen Gesellschaft 'Isis' (Dresden). (Also *Abhandl.*)
- SB. Ges. Königsb.*—Sitzungsberichte der k. physikalisch-ökonomischen Gesellschaft in Preussen (Königsberg). (See *Schr. Ges. Königsb.*)
- SB. Ges. Leipzig*—Sitzungsberichte der naturforschenden Gesellschaft zu Leipzig.
- SB. Ges. Marb.*—Sitzungsberichte der Gesellschaft zur Beförderung der gesamten Naturwissenschaften zu Marburg.
- SB. Ges. Morph.*—Sitzungsberichte der Gesellschaft für Morphologie und Physiologie in München (Munich).
- SB. Ges. Würzb.*—Sitzungsberichte des physikalisch-medicinischen Gesellschaft zu Würzburg.
- SB. Jen. Ges.*—Sitzungsberichte der Jenaischen gesellschaft für medicin-und-naturwissenschaftlichen Gesellschaft in Jena (Jena).
- SB. nat. Fr.*—Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin.
- SB. niederrhein. Ges.*—Sitzungsberichte der niederrheinischen Gesellschaft für Natur- und Heilkunde (Bonn). (Published with *Verh. & C.B. Ver. Rheint.*)
- SB. Soc. Erlangen*—Sitzungsberichte der Physikalisch-medicinischen Societät zu Erlangen.
- SB. z.-b. Wien.*—Sitzungsberichte der zoologisch-botanischen Gesellschaft in Wien (Vienna). (Also *Verh.*)
- Schr. Ges. Danz. (2)*—Neueste Schriften der naturforschenden Gesellschaft zu Danzig (Danzig).
- Schr. Ges. Königsb.*—Schriften der physikalisch-ökonomischen Gesellschaft zu Königsberg in Preussen.
- Schr. gessammt. Naturw. Marburg*—Schriften der Gesellschaft zur Beförderung der gesamten Naturwissenschaften zu Marburg.
- Schr. Nat. Ver. Schleswig*—Schriften des naturwissenschaftlichen Vereins für Schleswig-Holstein (Kiel).
- Schr. Ver. Harzes*—Schriften des naturwissenschaftlichen Vereins des Harzes in Wernigerode.
- Schr. Univ. Kiel.*—Schriften der Universität zu Kiel.
- Science*—Science (Dall: Cambridge, Mass.).

- Sci. Gos.*—Science Gossip (Taylor : London).
- Science Obs.*—Science Observer (Boston Scientific Society, U.S.A.).
- Sci. P. R. Dublin Soc.*—Scientific Proceedings of the Royal Dublin Society.
- Sci. Tr. R. Dublin Soc.* (2)—The Scientific Transactions of the Royal Dublin Society. Second series.
- Scot. Nat.*—The Scottish Naturalist (Trail : Perth).
- S. E. Z.*—Stettiner entomologische Zeitung (Dohrn : Stettin).
- Smiths. Contrib. Knowledge*—Contributions to Knowledge by the Smithsonian Institution (Washington).
- Smiths. Misc. Coll.*—Smithsonian Miscellaneous Collections (Washington).
- Soc. Sci. Vitry.*—Société des Sciences et Arts de Vitry la François (Arcis sur Aube).
- Sprawozd. Kom. fizyogr.*—Sprawozdanie Komisji fizyograficznej, &c. (Cracow).
- Stud. Biol. Lab. J. Hopkins Univ.*—Studies at the Biological Laboratory of the Johns Hopkins University (Baltimore).
- Stud. Micr. Sci.*—Studies in Microscopical Science (Cole : London).
- Sv. Ak. Handl.*—K. Svenska Vetenskaps-Akademiens Handlingar (Stockholm).
- Tag. Deut. Nat. Vers.*—Tageblatt der Versammlung deutscher Naturforscher und Aertzte.
- Taprobanian*—The Taprobanian (Nevill : Bombay).
- Tijdschr. Ent.*—Tijdschrift voor Entomologie (The Hague).
- Tijdschr. Nederl. Dierk. Ver.* (2)—Tijdschrift van de Nederlandsche Dierkundige Vereeniging (The Hague and Rotterdam).
- Tijdschr. Nederl. Ind.*—Naturkundig Tijdschrift voor Nederlandsch Indië (Batavia).
- Timehri*—Timehri : being the Journal of the Royal Agricultural and Commercial Society of British Guiana (Quelch : Demerara).
- Termes Közlöny*—Természettudományi Közlöny kiadja a k. magyar terminológus Társaság (Budapest).
- Term. füzetek*—Természettudományi füzetek : kiadja a magyar természettudományi Múzeum (Journal of Zoology, etc., edited by Hungarian Museum at Budapest).
- Tr. Albany Inst.*—Transactions of the Albany Institute.
- Tr. Am. Phil. Soc.*—Transactions of the American Philosophical Society (Philadelphia).
- Tr. Am. Ent. Soc.*—Transactions of the American Entomological Society (Philadelphia).
- Tr. A. S. Japan*—Transactions of the Asiatic Society of Japan (Yokohama).
- Trav. Ac. Reims*—Travaux de l'Académie nationale de Reims (Reims).
- Trav. Lab. Histol.*—Travaux du Laboratoire d'Histologie du Collège de France, École pratique des Hautes Études (Ranvier : Paris).

- Tr. Barrow Nat. Field Club*—Transactions of the Barrow Naturalists' Field Club.
- Tr. Newbury Club*—Transactions of the Newbury District Field Club.
- Tr. Cambridge Phil. Soc.*—Transactions of the Cambridge Philosophical Society.
- Tr. Conn. Acc.*—Transactions of the Connecticut Academy of Sciences (New Haven).
- Tr. Cumberl. Westmorl. Ass.*—Transactions of the Cumberland and Westmorland Association for the Advancement of Literature and Science (Goodchild : Carlisle).
- Tr. Edin. Geol. Soc.*—Transactions of the Edinburgh Geological Society.
- Tr. Edinb. Nat. Club*—Transactions of the Edinburgh Naturalists' Field Club.
- Tr. Ess. Club = Ess. Nat.*—Essex Naturalist; being the Journal, Transactions, and Proceedings of the Essex Field Club (Buckhurst Hill).
- Tr. E. Soc.*—Transactions of the Entomological Society of London.
- Tr. Geol. Soc.*—Transactions of the Geological Society of London.
- Tr. Hertf. Soc.*—Transactions of the Hertfordshire Natural History Society and Field Club (Watford).
- Tr. Kansas Ac.*—Transactions of the Kansas Academy of Science (Topeka).
- Tr. E. Kent Nat. Hist. Soc.*—Transactions of the East Kent Natural History Society (Canterbury).
- Tr. Leicester Soc.*—Transactions of the Leicester Literary and Philosophical Society (Leicester).
- Tr. L. S. (2)*—Transactions of the Linnean Society, London. Second series.
- Tr. L. S. New York*—Transactions of the Linnean Society of New York.
- Tr. Norw. Soc.*—Transactions of the Norfolk and Norwich Naturalists' Society (Norwich).
- Tr. N. Z. Inst.*—Transactions and Proceedings of the New Zealand Institute (Wellington).
- Tr. Odont. Soc.*—Transactions of the Odontological Society.
- Tromsø Mus. Aarsh.*—Tromsø Museum's Aarshefter.
- Tr. Ottawa Nat. Club*—Transactions of the Ottawa Field-Naturalists' Club.
- Tr. R. Irish Ac.*—Transactions of the Royal Irish Academy (Dublin).
- Tr. S. African Phil. Soc.*—Transactions of the South African Philosophical Society (Cape Town).
- Tr. R. Soc. Canada*—Proceedings and Transactions of the Royal Society of Canada (Montreal).
- Tr. R. Soc. Edinb.*—Transactions of the Royal Society of Edinburgh.
- Tr. R. Soc. S. Austr.*—Transactions and Proceedings and Report of the Royal Society of South Australia (Adelaide).
- Tr. R. Soc. Vict.*—Transactions and Proceedings of the Royal Society of Victoria.

- Tr. Shropshire Soc.*—Transactions of the Shropshire Archæological and Natural History Society (Shrewsbury and Oswestry).
Tr. Soc. Univ. Kharkow—Travaux de la Société des Naturalistes à l'Université Impériale de Kharkow.
Tr. Stirling Soc.—Transactions of the Stirling Natural History and Archæological Society.
Tr. St. Louis Acad.—Transactions of the Academy of Science of St. Louis.
Tr. Tyneside Club—Transactions of the Tyneside Naturalists' Field Club (Newcastle-upon-Tyne).
Trudui Kazan. Univ.—Trudui obshtchestva estestvoespytatelei pre emperatorskom Kasanskom Universitet.
Trudui Kharkoff Univ.—Trudui obshtchestva ispytatelei prihody pre imp. Kharkovakom universitet (Kharkoff).
Trudui Russ. Nat.—Trudui sezda russkich estestvoespytatelei.
Trudui St. Petersburg Naf.—Trudui sanct Petersburgskova obshtchestva estestvoespytatelei.
Tr. Wisconsin Acad.—Transactions of the Wisconsin Academy of Sciences, Arts, and Letters (Madison). (Also *Bulletin*.)
Tr. Yorksh. Union—Transactions of the Yorkshire Naturalists' Union (London & Leeds).
Tr. Z. S.—Transactions of the Zoological Society (London).

Uebers. Arb. schles. Ges. Breslau—Uebersicht der Arbeiten und Verhandlungen des schlesischen naturwissenschaftlichen Gesellschaft in Breslau.

Unters. Nat.—Untersuchungen zur Naturlehre des Menschen und der Thiere (Moleschott: Giessen).

Upsala Univ. Årsskrift—Upsala Universitets Årsskrift (Upsala). (Also *Act. Upsala*.)

Ver. Ak. Amst.—Verhandeligen der koninklijke Akademie van Wetenschappen (Amsterdam). (Also *JB*.)

Ver. geol. Reichsanst.—Verhandlungen der k.-k. geologischen Reichsanstalt (Vienna). (Also *JB*.)

Verh. Batav. Genoots.—Verhandeligen van het Bataviaasch Genootschap van Kunsten en wetenschappen (Batavia) (1880).

Verh. Ges. Basel—Verhandlungen der naturforschenden Gesellschaft in Basel (Bâle).

Verh. Ges. Würzb.—Verhandlungen der physikalisch-medicinischen Gesellschaft zu Würzburg.

Verh. naturw. Ver. Karlsruhe—Verhandlungen des naturwissenschaftlichen Vereins in Karlsruhe.

Verh. Phys. Ges. Berlin—Verhandlungen der Physikalischen Gesellschaft zu Berlin.

Verh. siebenb. Ver.—Verhandlungen und Mittheilungen des siebenbürgischen Vereins für Naturwissenschaften (Hermannstadt).

- Verh. Ver. Brünn*—Verhandlungen des naturforschenden Vereins in Brünn.
Verh. Ver. Hamb.—Verhandlungen des Vereins für naturwissenschaftliche Unterhaltung zu Hamburg.
Verh. Ver. Heidelb.—Verhandlungen des naturhistorisch-medicinischen Vereins zu Heidelberg.
Verh. Ver. Presburg.—Verhandlungen des Vereins für Natur- und Heilkunde zu Presburg.
Verh. Ver. Rheinl.—Verhandlungen des naturhistorischen Vereins der preussischen Rheinlande und Westphalen (Bonn). (Also *CB.*)
Verh. z.-b. Wien—Verhandlungen der Kaiserlichen-königlichen zoologisch-botanischen Gesellschaft in Wien (Vienna). (Also *SB.*)
Versl. Ak. Amst.—Verslagen en Mededeelingen der k. Akademie van Wetenschappen (Amsterdam).
Vict. Nat.—Victorian Naturalist (Melbourne).
Vid. Medd.—Videnskabelige Meddelelser fra den naturhistoriske Forening (Copenhagen).
Viert. Ges. Zürich—Vierteljahrschrift des naturforschenden Gesellschaft in Zürich (Wolf-Zurich).

Wiedomosci z nauk przyrod. = Materialien zu dem Wissenschaften (Warsaw).

Wien. ent. Z.—Wiener entomologische Zeitung (Vienna).

Wilt. Mag.—The Wiltshire Archæological and Natural History Magazine (Devizes).

Wesley Nat.—The Wesley Naturalist. Monthly Journal of the Wesley Scientific Society (Dallinger et alii : London).

York Phil. Soc.—Yorkshire Philosophical Society Annual Report (York).

Young Nat.—The Young Naturalist (Morley : Huddersfield).

Zapiski Kiev.—Zapiski Kievskova Obshtchestva Estestvoespytatelei (Kieff).

Zapiski Novoross. Obsch. Estestv.—Zapiski novorossiysche Obshtchestva estestvoespytatelei (Odessa).

Z. Biol.—Zeitschrift für Biologie (München).

Z. Ent. Bresl.—Zeitschrift für Entomologie (Breslau).

Z. Ferdinand. Tirol Vorarlberg—Zeitschrift des Ferdinandeums für Tirol und Vorarlberg (Innsbrück).

Z. f. Ethnol.—Zeitschrift für Ethnologie (Bastian & Hartmann : Berlin).

Z. f. Thiermed.—Zeitschrift für Thiermedizin und vergleichende Pathologie.

Z. geol. Ges.—Zeitschrift der deutschen geologischen Gesellschaft (Berlin).

Z. ges. Orn.—Zeitschrift für die gesammte Ornithologie (Von Madarász : Budapest).

Z. Naturw.—Zeitschrift für Naturwissenschaften. Original Abhandlungen und Berichte herausgegeben im Auftrage der naturwissenschaftlichen Vereins für Sachsen und Thüringen (Brass : Halle-a-S.).

- Zool.* (3).—The Zoologist. Third Series (Harting : London).
Zool. Anz.—Zoologischer Anzeiger (Carus : Leipzig).
Zool. Beitr.—Zoologische Beiträge (Schneider : Breslau).
Zool. Gart.—Der Zoologische Garten (Wienland, Bruch, & Noll : Frankfurt).
Zool. Jahrb.—Zoologische Jahrbücher (Spengel : Bremen).
Zool. JB.—Zoologischer Jahresbericht (Mayer & Giesbrecht : Leipzig).
Zool. Rec.—The Zoological Record (Beddard : London).
Z. wiss. Geogr.—Zeitschrift für wissenschaftliche Geographie (Kettler : Lahr, in Baden).
Z. wiss. Mikr.—Zeitschrift für wissenschaftliche Mikroskopie und für mikroskopische Technik (Berens : Braunschweig).
Z. wiss. Zool.—Zeitschrift für wissenschaftliche Zoologie (Köl liker & Ehlers : Leipzig).
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CORRIGENDA.

INSECTA.

Page 265, line 20, for "*Nonagriæ*," read "*Nonagria*."

MYRIOPODA.

Page 1, line 1, read "MYRIOPODA (including PERIPATUS)."

CRUSTACEA.

Transfer ENTEROPSIDÆ, p. 35, to p. 41, under COPEPODA.

ZOOLOGICAL RECORD

FOR 1886.

GENERAL SUBJECTS.*

BY

J. ARTHUR THOMSON, M.A., F.R.S.E.,

Lecturer on Zoology in the School of Medicine, Edinburgh.

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Leipzig : large 8vo, continued.

°BARANSKI, A. Geschichte der Thiersucht und Tiermedizin im Alter-
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- BRONN'S *Klassen und Ordnungen des Thierreichs*. Continuation of *Protozoa* by O. Bütschli. Completion of *Porifera* by G. C. J. Vosmaer. Continuation of *Arthropoda* by A. Gerstaecker. Continuation of *Reptilia* by C. K. Hoffmann. Continuation of *Aves* by Hs. Gadow. Continuation of *Mammalia* by W. Leche. Leipzig & Heidelberg : Winter.
- BRÜHL, K.B. *Zootomie aller Thierclassen*. Wien : Holder, several Lief., each 2/-. (*Reptilia*.)
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- *DEBIERRE, CH. *Manuel d'Embryologie humaine et comparée*. Paris : 6/6, Oct., 1886, 800 pp., 321 figs., 8 coloured plates.
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- *EDLINGER, A. v. *Erklärung der Thier-namen aus allen Sprachgebieten*. Landshut : Krüll, 2/-, 8vo, 117 pp.
- Encyclopädie der Naturwissenschaften*, Hrsg. v. W. Förster, A. Kenngott, &c. Continuation of Zoological parts. Breslau : Trewendt.

GENERAL WORKS, TEXT-BOOKS, ETC. *Gen. Sub. 3*

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- HOYLE, W. E. [See LEUCKART.]
- HOWES, G. B. *Biological Atlas.* London: Macmillan & Co.
- °KINGSLEY, J. S., [Editor of] *The Standard Natural History.* Boston: 4to, 189 pp. [See PACKARD, A. S.]
- °KNAUER, F. *Handwörterbuch der Zoologie von Della Torre bearb.* Stuttgart: Enke, 20/-, 8vo, 9 pls.
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- *NEWTON, E. T. *Synopsis of the Animal Kingdom, with especial reference to the Fossil Forms*. 1886 : 8vo.
- NICHOLSON, H. A. *Natural History : its Rise and Progress in Britain, as developed in the Life and Labours of Leading Naturalists*. Edinburgh : Chambers, 5/-, 8vo, 318 pp.
- . *Text Book of Zoology*, 4th edition, revised and enlarged. London : 7/6, 4to, 372 pp.
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- * — . *First Lessons in Zoology*. Holt and Gill.
- PARKER, W. N. Translation of Wiedersheim's smaller Text-book, *The Comparative Anatomy of Vertebrates*. London : Macmillan, 13/-, 8vo, 270 pp.
- *PEREZ ARCAS, L. *Elementos de Zoologia*, Edic. 6. Madrid : 14/-, 4to, 575 pp., 570 figs..
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- YUNG, E. [See VOGT, C.]
- *ZENZ, W. *Zoologie für Lehrer- und Lehrerinnen-Bildungsanstalten*. Wien : 1886, 1/6, large 8vo, 155 pp.
- *ZITTEL, K. A., & HAUSHOFER, R. *Palæontologische Wandtafeln*. Kassel : Fischer, 13/-, 6 lief, taf. 21-26.
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- *ZITTEL, H. A. v. *Palæontographica. Beiträge zur Naturgeschichte der Vorzeit*. Unter Mitwirkung von W. Benecke, E. Beyrich, Frhr. v. Fritsch, M. Neumayr, und F. Römer. Stuttgart : Schweizerbart, 4to, 1 lief, p. 73, 7 pls.
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B.—THEORY OF EVOLUTION.

1. *General.*

- ALLEN, GRANT. *Charles Darwin*. London : Longmans, 1885, 8vo, 212 pp.
- *AITKEN, W. *The Doctrine of Evolution in its Application to Pathology*. Glasgow : MacDougall.

*AELING, E. Die Darwinische Theorie. Stuttgart : Dietz, 8vo, 71 pp.

*BAKER, F. Relative Stability of Organs as dependent on Phylogeny. Am. Ass. for Adv. of Science, xxxv, 1886.

*BUNGE, G. Vitalismus und Mechanismus. Leipzig : 8vo, -/6, 20 pp.

CARNERI, B. Vergängliches und Bleibendes im Darwinismus. Kosmos, xviii, pp. 401-415.

Principally a criticism of Weismann's and Spitzer's conclusions.

— Sedgwick, Wallace, du Prel und die Lehre Darwin's. *Op. cit.* pp. 321-338.

Mainly non-zoological.

*CATTANEO, G. Giovanni Lamarck e Carolo Darwin. Milano-Torino : Domolard, 8vo, 36 pp.

*COCHIN, D. L'Evolution et la Vie. Paris : G. Masson.

CONN, H. W. Evolution of To-day. New York : 8vo, 350 pp.

*— The Limits of Organic Evolution. Am. Nat. xx, pp. 413-422.

COPE, E. D. The Origin of the Fittest. Macmillan, 465 pp.

*COUTANCE, A. Les Théories de la Vie jugées dans l'œuf. Paris : 2/6, 8vo, 105 pp.

CUNNINGHAM, J. T. Charles Darwin, Naturalist. Edinburgh : Brown, 8vo, 32 pp.

*DALL, W. H. Deep-Sea *Mollusca*. Bull. Mus. C. Z. xii, pp. 171-318, 9 pls. ; J. R. Micr. Soc. 1887, p. 61.

Inter alia—"Natural selection may act as successfully by confining the inflexibility of a particular stock, as by seizing the favourable variations of the vast majority of living beings which vary indefinitely in all directions."

*DAWSON, J. W. The Origin of the World according to Revelation and Science. Fourth edition, with corrections and additions. London : 7/6, 8vo, 450 pp.

*DIXON, C. Evolution without Natural Selection, or the Segregation of Species, &c. (1885.) Critical Review. Ann. N. H. xvii, pp. 381-384.

*DUVAL, M. Le Darwinisme. Paris : Lecrosnier.

*GASCO, F. Influenza della Biologia sul pensiero moderno. Roma : Loescher, 8vo, 57 pp.

*GAULE, J. Die Stellung des Forschers gegenüber dem Problem des Lebens. Rede. Leipzig : Vert & Co., 8vo.

GEDDES, P. Theory of Growth, Reproduction, Sex, and Heredity. P. R. Soc. Edinb. pp. 911-931.

"In short, all the modifications of form, floral or other, in one or in two generations, must be explained—not in terms of 'spontaneous variation,' *i.e.*, by unaccountable variations in each special case, with natural selection varying also with circumstances for each special case, as has

been usually believed and maintained—but in terms of the fundamental protoplasmic processes, by reference to the rhythm of anabolism and katabolism.”

HAACKE, W. Bioekographie, Museenpflege, und Kolonialthierkunde. Jen. Z. Nat. xix, pp. 790–849.

Inter alia—Orientation of the science, with new terminology, and notes on problems of evolution.

*HANSEN, G. A. Afstamningsteorien eller Darwinismen. Bergen : 8vo, 2 pls.

*HARRIS, J. C. Le Darwinisme et la Démocratie. Nice : 16mo, 16 pp.

*JAMES, W. P. On the Relation of Fossil Botany to Theories of Evolution. Journ. Trans. Vict. Inst. xix (1885), p. 168.

*JOLY, H. Psychologie comparée. L'Homme et l'Animal. 2 Edit. revue et corrigée. Paris : 3/–, duodec.

*KAINE, J. J. The Light of Life ; or, the Secrets of Vegetable and Animal Development, detected and explained in strict conformity with known natural and chemical laws. London : 10/–, 8vo, 182 pp.

*GADEAU DE KERVILLE, H. Causeries sur le transformisme. i, Exposé d. l. doctrine transformiste ; ii, Historique et progrès de la doctrine transformiste ; iii, De l'évolution des animaux et des plantes ; iv, Sélection artificielle et transformisme. Elbeuf : 12mo.

KRAUSE, E. Ueber die Nachteile der einseitigen Anpassung. Kosmos, xix, pp. 161–175.

Rapid nemesis of one-sided adaptation. Necessity of stable evolution being slow.

*—. Gesammelte kleinere Schriften von Charles Darwin. Leipzig : Günther, large 8vo, 278 pp.

*KÜNSTLER, J. La théorie de la descendance d'après Nägeli. Rev. Sci. xxvii, pp. 237–241.

*LACHMUND, A. Die Entwicklungslehre. Zwei Vorträge. Leipzig : 8vo, 74 pp.

*LAING, S. Modern Science and Modern Thought. London : 8vo, 3rd edition.

*LEROY, M. D. L'évolution des espèces organique. Paris : Perrin, 18mo, 203 pp.

MEEHAN, T. On Parallelism in Distinct Lines of Evolution. P. Acad. Philad. 1886, pp. 294 & 295.

“Environment seems to have no further influence than to incite to action a change already ripe for development. Variations are in accordance with a prior plan, by which nature itself is bound.”

*MEUNIER, V. Avenir des espèces : les animaux perfectibles. Paris : Steinheil, 8vo, 363 pp.

- *MICHELIS, F. Antidarwinismus. Ueber's Kritik der Weltansicht, Du Bois Reymond's und Sachs' Vorlesungen über Pflanzenphysiologie. Zwei stumme Zeugen für die Richtigkeit meiner idealen Weltauffassung. Heidelberg: 8vo, 75 pp.
- *MÖBIUS, K. Die Bildung, Geltung und Bezeichnung der Art-Begriffe und ihr Verhältniss zur Abstammungslehre. Zool. JB. Bd. i (also Jena: Fischer).
- MORRIS, C. Methods of Defence in Organisms. P. Ac. Philad. 1886, pp. 25-29; J. R. Micr. Soc. vi. pp. 948 & 949.
Methods of defence considered in relation to evolution.
- MOSELY, H. N. Summary of Weismann. Nature, xxxiii, pp. 629-632.
- *MÜNSTERBERG, H. Die Lehre von der natürlichen Anpassung in ihrer Entwicklung, Anwendung und Bedeutung. Leipzig: 1885, 114 pp.
- *QUATREFAGES, A. DE. Histoire générale des Races Humaines, Questions générales. Paris: 8vo, 227 cuts, 4 pls., &c.
- *RENOOZ, C. Nouvelle théorie de l'évolution basée sur le développement embryonnaire tel qu'il est. J. Microgr. x, pp. 135-159.
- ROMANES, G. J. Physiological Selection: an additional suggestion on the Origin of Species. J. L. S. xix, pp. 337-411; abstr. Nature, xxxiv, pp. 314-316, 336-340, & 362-365.
- "As a theory of origin of species, natural selection has in its way three cardinal difficulties: (1) The difference between species and varieties in respect of mutual fertility; (2) The swamping effects of free intercrossing upon an individual variation; (3) The inutility to species of so large a proportion of specific distinctions." "Natural selection is not, properly speaking, a theory of the origin of *species*; it is a theory of the origin—or rather of the cumulative development—of *adaptations*."
- "Whenever any variation in the highly variable reproductive system occurs, tending to sterility with the parent form, without impairing fertility with the varietal form, a physiological barrier must interpose, dividing the species into two parts, free to develop distinct histories, without mutual intercrossing, or by independent variation." "By regarding mutually sterile species as records of variation in reproductive systems, we are at work, so to speak, on the foundation of the matter."
- . Physiological Selection; Nature, xxxiv. Criticisms by Argyll, Duke of; Meldola, R.; Wallace, A. R., &c.
- . Criticism by "F. J. B." Athenæum, No. 3069.
- *SABATIER, ARM. Essais d'un naturaliste transformiste sur quelques questions actuelles. Alençon: 8vo, 63 pp.
- *SEDGWICK, W. Life: the Explanation of it. London: 2/6, 8vo.
- SPENCER, HERBERT. The Factors of Organic Evolution. Nineteenth Century, No. 86; Kosmos, xvii, and separately, Williams & Norgate.
- "The direct action of the medium was the primordial factor of organic evolution. Acting alone, it must have initiated the primary

differentiation in all units of protoplasm alike. Variations in the surrounding influences over an area would effect small contrasts in degree and kind of differentiation. As soon as these became decided, natural selection came into play. The differentiating action of the medium never ceased to be a co-operator in development, as a cause, both direct and indirect, of modifications of structure. With sexual reproduction, there came into play causes of frequent and marked fortuitous variations. The results of the mixtures of constitutional proclivities were mostly suppressed, but sometimes increased, by survival of the fittest. Natural selection became the predominant factor in relation to fortuitous variations of structure, of no account in the converse with the medium, but of much account in the struggle with enemies and competitors." Especially with plants and relatively inactive animals, "the survival of individuals, which had varied in favourable ways, must all along have been the chief cause of the divergence of species and the occasional production of higher ones. Gradually the inheritance of those modifications of structure, caused by modifications of function, becomes more and more important."

SPITZER, H. *Beiträge zur Descendenztheorie und zur Methodologie der Naturwissenschaft.* Leipzig : Brockhaus, 8vo, 539 pp.

*STEINACH, AD. *System der organischen Entwicklung naturwissenschaftlich-kritisch dargestellt.* Th. I. *Die Entwicklung der Pflanzen und Thiere.* Basel : Schwabe, 8vo, 642 pp.

*STURTEVANT, E. L. *Atavism the result of cross-breeding lettuce.* Am. Ass. for Adv. of Science, xxxv.

SUTTON, J. B. *On Atavism : A Critical and Analytical Study.* P. Z. S. 1886, pp. 551-558.

Atavism defined as development of transmitted characters normally latent. "Neogenetic" atavism (where abnormal part is *not* found as a germ in the embryo) has no existence. Atavism in relation to prostate, and secondary sexual characters. Their non-development, though latent, in female.

— General Pathology. London : Churchill, 8vo, 380 pp., 149 figs.

Pathology as a factor in evolution. "Evolution has played as important a part in pathology as in biology, and structural peculiarities, pathological in their origin, have been transmitted as race-characteristics in more than one group of animals." The differences in the classes of animals involve liabilities and immunities. In discussing evolution, aberrations in structure and function must be included.

*VIANNA DE LIMA, A. *Exposé sommaire des Théories Transformistes de Lamarck, Darwin, et Hæckel.* Paris : 4/6, duodec.

*VOGT, C. *Quelques hérésies darwinistes.* Arch. Sci. Nat. Genève, xvi, pp. 330-338.

*WAINWRIGHT, S. *Scientific Sophisms. Review of Current Theories concerning Atoms, Apes, and Men.* New ed. London : 8vo, 290 pp.

*WEISMANN, A. Ueber den Rückschritt in der Natur. Ber. Freiburg Ges. ii. pp. 1-30.

——. Die Bedeutung der Sexuellen Fortpflanzung für die Selections-Theorie. Jena: G. Fischer. (Summary by H. N. Moseley, *Nature*, xxxiv, pp. 629-632.) Cf. Die Continuität des Keim-plasmas, &c., 1885.

Main theme—the importance of sexual reproduction as a moment in evolution. Special new characters acquired by the Metazoan parent in response to environmental influences are not known to be hereditarily transmitted to offspring. On the theory of the continuity of the germ-plasma, the molecular constitution of the germ-plasma is already determined within the embryo. It grows enormously in quantity, but retains its original structure persistently, not directly influenced by environment, which cannot therefore originate variations. Sexual reproduction, as the mingling of two different sets of hereditary tendencies, supplies the material for the development of individual variations, out of which selection produces new species. It does not obliterate, but sums up the minute individual differences. The prepotency of the various kinds of idio-plasm which compose the germ-plasma of the germ-cells of each individual must vary in intensity at various periods of life. Hereditarily transmissible variation having arisen in the *Protozoa* by the direct action of external conditions, is retained in the *Metazoa*, and enhanced by ever changing combinations in sexual reproduction. The primitive action and meaning of conjugation is a strengthening of the forces of the organism in relation to reproduction, and does not imply rejuvenescence. It afterwards becomes a source of variability. A species parthenogenetically reproduced must be nearing its extinction; superfluous organs do not become rudimentary in such species.

*WIGAND, A. Grundsätze aller Naturwissenschaft. Marburg: -/6, 35 pp.

*WILSON, A. S. The Survival of the Fittest. A. Gardner.

*WORSLEY-BENSON, H. S. Charles Darwin. Bath: 8vo.

*ZECHA, A. Versuche mit der Truthühnerzucht auf Racebildung. MT. orn. Ver. Wien (10) xxiv, pp. 284-287.

2. Variation.

BEDDARD, F. E. Variations in *Perionyx excavatus*. P. Z. S. pp. 308-314, 4 figs.

Fifteen variations in position and number of genital pores, &c.

*CUTLER, E. Probable Cause of some Monstrosities: the Abnormal Forms of *Spermatozoa*. Medical World, iv, pp. 18-20; J. R. Micr. Soc. vi, p. 58.

*DALL, W. H. [See Evolution (1).]

The greater number of similar members or parts, the greater the tendency to vary (1) in the minor features, and (2) in the number per individual as compared with average number for species. In deep-sea the

external factors making for variations are almost eliminated ; therefore "a very wide range of variation in form and sculpture within the specific limits of the 'flexible' species," and great uniformity of the inflexible.

*DANILEWSKY, A. J. Forces organoplastiques des organismes. Khar-kof : 1886, p. 41.

DARESTE, C. Nouvelles recherches sur la production de monstruosités dans l'œuf de la poule, par une modification du germe antérieure à la mise en incubation. C.R. ciii, pp. 355 & 356 ; J. R. Mier. Soc. vi, p. 939.

Monstrosities in development of chick due to that individuality which plays so important a part in teratology.

*DÜSING, C. Ein neues Gesetz der Variation. Kosmos (1885), ii, p. 142.

EIMER, T. Streifung der Thiere. Biol. Centralbl. vi, pp. 285 & 286 ; Ber. Vers. Naturf. Strassburg (1885).

In relation to markings of animals emphasizes the origin of species from constitutional causes, without any primary relation to utility.

*FRIVALDSZKY, —. Difformitates et monstrositates Coleopterorum. Term. füzetek. 8 col. figs. ; Ung. Nat. Mus. Budapest, x heft.

Must be taken as type of numerous observations on variations of *Insecta* (q.v.).

GALTON, F. Origin of Varieties. Nature, xxxiii, pp. 395 & 396.

"Each incipient variety is probably rounded off from among the parent stock by means of peculiarities of sexual instinct."

GAUTIER, A. Du Mécanisme de la variation des êtres vivants. Hommage à M. Chévreul. Paris: Alcan. pp. 29-52.

Variation and heredity discussed from a chemical point of view. "The force which maintains the species, and gives it its character of constancy and resistance, in a word, its atavistic force, seems to be nothing more than the resultant of the forces which maintain the *chemical species* of which the organism is composed. The condition of variation, or of individualisation, is, on the contrary, the more or less marked facility which these essential specific molecules possess of varying slightly in annexing different secondary radicals. The stability of the general molecular type, the instability of the secondary variations which it may exhibit, explain at once the condition and the power of 'atavism,' and the nature and instability of variations."

*GRATACAP, L. P. Zoic Maxima, or Periods of Numerical Variations in Animals. Am. Nat. xx, pp. 1009-1016.

PFITZNER, W. [See Cell.] Pathological variations of nuclei.

ROULE, L. Sur quelques variations individuelles de structure des organes chez les Ascidies simple. C.R. cii, pp. 831-833.

A character (mode of opening of excretory canal) accidental in some individuals, persistent and characteristic of other species and genera.

ROUX, W. Zur Mechanik der Entwicklung. Z. Biol. xxi, pp. 1-118.

Mechanics of development. *Self-differentiation*, where the specific nature of the modification is determined by the energies of the system, to be distinguished from *correlative differentiation*, or change determined by action and reaction between the system and its environment.

VIRCHOW, R. [See Heredity.]

Every variation means some disturbance of the organismal diathesis, and is so far pathological. Certain varieties, species, and even genera, may certainly be described as pathological. Discussion of teratology in relation to variation and heredity.

3. *Environment.*

BARFURTH, D. Biologie der Forellen. Arch. mikr. Anat. xxvii, pp. 121-178, 2 pls.; J. R. Micr. Soc. vi, p. 768.

Sterility of trout temporary, caused especially by prevention of spawning by reason of want of suitable depositing ground, unfavourable temperature, nutrition, &c; degeneration and reabsorption of the hypertrophied organs; finally, permanent sterility, or the production of weak forms.

—. Experimentelle Untersuchungen über die Verwandlung der Froschlärven. Biol. Centralbl. vi, 20, pp. 609-613.

—. Ueber Versuche zur Verwandlung der Kaulquappen. Tag. Deut. Nat. Vers. lix, p. 139; Anat. Anz. i, pp. 314-317; Naturforscher, xix, pp. 490 & 491.

BRANDT, R. Die Sphærozoen. Naples Monograph, xiii.

Sensitiveness to changes in salinity, indifference to light, &c.

BRAUER, FR. Ueber Artemia und Branchipus. Zool. Anz. iv, pp. 364 & 365.

Criticism of conclusions of Schmankewitsch.

CLAUS, C. Untersuchungen über die Organisation und Entwicklung von Branchipus und Artemia. Arb. z. Inst. Wien, ii.

Inter alia, critique as to conclusions of Schmankewitsch on effects of environment on these forms.

DALL, W. H. Report on *Mollusca*. Bull. Mus. C. Z. xii, pp. 171-318, 9 pls.

Inter alia, general notes on influence of environment.

DARESTE, C. Recherches sur l'évolution de l'embryon de la poule lorsque les œufs sont soumis à l'incubation dans la position verticale. C.R. ciii, No. 16, pp. 696 & 697.

DÜSING, C. Ueber die Färbung und Zeichnung der Thiere. Kosmos, xix, pp. 382-393, 453-463.

Review of Eimer, Weismann.

—. [See Reprod.]

FONTANNES, M. Sur certaines corrélations entre les modifications qu'éprouvent des espèces de genres différents, soumises aux mêmes influences. C.R. ciii, pp. 1022-1024.

*GAUCKLER, H. Einfluss höher Temperaturen auf dem Organismus von Insekten. Die Insekten Welt. 3 Jahrg. ix. p. 49.

*GEILHOF, G. Beobachtungen über künstliche Abkürzung des Puppenstadiums bei europäischen Schmetterlingen. Die Insekten Welt. Jahrg. 3, pp. 27 & 28.

GIARD, A. De l'influence de certains parasites rhizocéphales sur les caractères sexuels extérieurs de leur hôte. C.R. ciii, pp. 84-86.

*HALL, A. E. Rapid Hatching of Lepidopterous Ova. Ent. xix, p. 257.

HERMANN, L. Influence of Electric Currents on Tadpoles. Arch. ges. Phys. xxxix, pp. 414-419; J. R. Micr. Soc. 87, pp. 51 & 52.

In a vessel through which an electric current passes, tadpoles dispose themselves with head towards the anode, &c.

JOURDAIN, S. [See Reprod.].

Weather in Relation to sex.

KELLER, R. Ueber die Austrocknungsfähigkeit der Pflanzen. Kosmos, xix, pp. 56-59.

LUCIANI, L. Sulla vita latente delle uova del Baco da seta. Bull. Soc. Ent. Ital. xviii, pp. 71 & 185 (*cf.* Verson, p. 160).

*MARCACCI, A. Influenza del movimento sullo sviluppo dell' Uovo di Pollo. Perugia: 8vo, 22 pp., 2 pls.

MAUPAS, E. [See Reprod.].

Relation between nutrition and modes of reproduction in Infusorians.

M'ALDOWIE, A. M. Development and decay of pigment layer on birds' eggs. J. Anat. Phys. xx, pp. 225-237.

Primarily for protection from solar rays, modified for concealment. Coloration varies in direct ratio to amount of light to which the eggs are exposed.

MÉGNIN, P. Nouvelles études anatomiques et physiologiques sur les Glyciphages (Acarina). C.R. ciii, pp. 1276-1278.

In the inert perishing Acarid a conservative cyst is formed in the thoracic region, and from this, after long periods, a new form may, on the return of fit environment, be developed.

PENNETIER, G. Limite de la résistance vitale des anguillules de la nielle. T. c. pp. 284-286.

Retain powers of revivification for fourteen years, but not longer.

PLATE, L. [See Reprod.].

Conjugation appears to be strikingly epidemic, possibly due to sudden change in external relations.

PLATNER, G. [See Oogenesis].

The rapid growth of ova in hermaphrodite gland of *Arion* is the natural result of the direct supply of abundant food ensured by their peripheral position.

Plants Considered in Relation to their Environment. *Nature*, xxxiii, pp. 607-609.

POULTON, E. B. Colour Relation between Larva of *Smerinthus ocellatus* and its Food-plants. *P. R. Soc.* xl, pp. 135-173.

Colour of larva determined (1) by hereditary influence, (2) by the colour of the leaf upon which it lives, and not by the substance of the leaf when eaten, (3) by individual variation with similarity of parentage, conditions, &c.

— . Colour of Pupæ. *Tr. E. Soc.* 1886, pp. 46-48 ; *J. R. Micr. Soc.* 1887, 74 pp.

The surrounding colour either affects some terminal organ, or more diffusely some superficial element in the larval tissues.

PREYER, W. Bewegungen der Seesterne. *MT. z. stat. Neap.* vii, pp. 27-127, 27 cuts.

Inter alia—Influence of various re-agents, drugs, &c., on movements of Star fishes.

REGNARD, P. Action des hautes pressions sur les tissus animaux. *C.R.* cii, pp. 173-176.

RÖDEL, H. Ueber die untere Temperaturgrenze bei welcher niedere Thiere noch existiren können. *Jen. Z. Nat.* lix, pp. 183-214 ; *J. R. Micr. Soc.* 1887, p. 52.

Resistance to cold (in Worms, Arthropods, Molluscs) varies greatly with size, structure, body-temperature, protective covering, &c., increases with progressive development. Degree and duration must be separately estimated. Graded results—degeneration, cessation of certain functions, coma, death.

ROMANES, G. J. Experiments with Pressure on Excitable Tissues. *P. R. Soc.* pp. 446 & 447.

ROUX, W. [See Reprod.].

Influence of electrical and mechanical stimulus on Frog ova. Formal development of embryo, independent of gravity.

SARASIN, G. Notiz über directe Communication des Blutes mit dem umgebenden Medium. *Arb. Inst. Würzb.*, viii, Heft. 1.

SPENGEL, J. W. Schwerkraft und Zelltheilung. *Biol. Centralbl.* v, pp. 663-668.

Review of recent researches.

STEMANN, v. Ueber den Einfluss der Nahrung auf das Umherstreifen, &c., der Thiere. *Jehr. Nat. Ver. f. Schleswig.* vi, pp. 108-111.

VERSION. Influenza delle condizioni esterne sulle proprietà fisiche dei bozzoli. Bull. Ent. Nat. xviii, p. 360.

VIRCHOW, R. [See Heredity]. Acclimatisation. (58 Versammlg. Naturf. Strassburg.)

WARYNSKI, S. Sur la production artificielle des monstres à cœur double. Rec. Z. Suisse iii, pp. 261-311.

WILCKENS, M. Ueber das Geschlechtsverhältniss und die Ursachen der Geschlechtsbildung der Haustieren. Biol. Centralbl. 1886, vi, p. 15; Landw. Jahr. Berlin, 1886, xv, pp. 607-651.

ZACHARIAS, O. Können die Rotatorien und Tardigraden nach vollständiger Austrocknung wieder Aufleben oder nicht. Biol. Centralbl. vi, pp. 230-235.

No! it is only the ova which develope.

—-. [See Reprod.] Influence of nutrition on asexual production.

4. *Heredity.*

BARFURTH, D. Biologie der Forellen. Arch. mikr. Anat. xxvii, pp. 128-178, 2 pls.

The influence of hindered spawning is not confined to modifying ovary, but the mature elements afterwards produced result in degenerate trouts.

BERTHOLD, G. Studien über Protoplasma-mechanik. Leipzig: Felix, 8vo, 332 pp., 7 pls..

Just as the connection between the individual stages of one and the same form, so the connection between generations is effected by the chemical continuity of the constituent substances, and by the definite morphological composition of the reproductive elements.

CADÉAC & MALET. Sur la transmission de la morve de la mère au fœtus. C.R. cii, pp. 133-135.

Only rarely transmitted.

*CATTANEO, G. Review of Weismann's theory. Bull. Soc. Maggi. vii, pp. 120-124.

CARNERI, B. [See Evolution]. *Inter alia* Critique of Weismann on Heredity.

FRENZEL, J. Idioplasma und Kern-substanz. Arch. mikr. Anat. xxvii, pp. 73-128; J. R. Micr. Soc. vi, p. 394.

Critical review of recent contributions to theory of heredity. Specific characters transmitted by the nuclei; general characters through the protoplasm of ovum.

GRÜBER, A. [*loc. cit.* Reprod.] Importance of nuclei.

GALTON, F. Family Likeness in Eye-colour. P. R. Soc. xl, pp. 402-416.

—-. Family Likeness in Stature. *T. c.* pp. 42-73.

[GALTON, F.] Hereditary Stature. Rep. Brit. Ass. 1885, pp. 1206-1214.
 Presidential Address to Anthropolog. Institute. Nature xxxiii, pp.
 295-298.

GEDDES, P. Theory of Growth, Reproduction, Sex, and Heredity. P.
 R. Soc. Edinb., pp. 911-931.

"If the reproductive elements start with a specific protoplasm continuous with that of the combined mother ovum and fertilising sperm, that is, with a concentrated accumulation of characteristic anastates and katastates, the simple fact that the products of protoplasmic change must be fixed, definite, and continuous, as in all chemical processes, gives us at once a protoplasmic basis from which to explain the constant and necessary symmetry of segmentation and development. And further, since all the organs of the body do, to a certain extent, share mutually in nutriment and in waste products, both germinal cells and developing embryo may accumulate a proportion of characteristic anastates and katastates, acquired, as it were, "pangenetically" from the organs of the body."

*HALLEZ, P. Pourquoi nous ressemblons à nos parents. Paris: 1886,
 8vo, 32 pp.

HEYMANN, R. Ein Beitrag zur Heredität seltener Geschwulstformen—
 multiple cartilaginäre Exostosen. Virchow's Archiv. civ, pp. 145-156.

"As in malformations or in development of supernumerary members, in regard to which inheritance has been frequently observed, so is it in regard to tumours; in both cases the cause is deficiency in the embryonic rudiment, or a superfluous production of embryonic material.

KÖLLIKER, A. Das Karyoplasma und die Vererbung. Z. wiss. Zool. xlv, pp. 228-238.

Supplement to previous paper on importance of nucleus (*loc. cit.* 1885), and critique of Weismann. (1.) The idioplasm in nucleus of fertilized ovum increases in mass as the development proceeds, but transmits its internal structure unchanged to the nuclei of all the cells forming the embryo. Deep difference between somatic and reproductive cells denied. (2.) In the various cellular modifications the characteristics of the original nuclear idioplasm may be wholly retained, or degenerate, or be wholly lost.

MÜLLER, FRITZ. Review of "The Law of Heredity," by W. K. Brooks.
 Baltimore: 1883. Kosmos, xviii, pp. 67-73.

OLDENDORFF, A. Die periodischen Sterblichkeits - Schwankungen.
 Virchow's Archiv. cv, pp. 110-128, 1 pl.

Inter alia, observations on inherited and acquired "disposition" and immunity.

RAUBER, A. Personaltheil und Germinaltheil des Individuums. Zool.
 Anz. ix, pp. 166-171.

Historical note in reference to above distinction, of late so much emphasized, but proposed by Hæckel in 1874, and Rauber in 1879.

SEDGWICK, A. Development of Cape Species of *Peripatus*. Q. J. Micr. Sci. xxvi, pp. 175-207, 3 pls.

If protoplasm of body primitively a syncytium, and the ovum until maturity part of this, separation of generative products does not differ essentially from internal gemmation of a Protozoon, and inheritance of parental peculiarities is rendered less mysterious, as change in molecular constitution of any part would naturally spread through the whole mass.

SUTTON, J. B. On Atavism. P. Z. S. 1886, pp. 551-558.

"The facts at our disposal seem to point to the conclusion that the epiblast is chiefly derived from the male element, while the female pronucleus is responsible chiefly for the hypo- and greater portion of the mesoblast."

— General Pathology. London: Churchill, 8vo, 380 pp., 149 figs.

Discussion of hereditary transmission of pathological characters.

VIRCHOW, R. Descendenz und Pathologie. Virchow's Archiv. ciii, pp. 1-15, 205-215, & 413-437.

Critique of Weismann's theory of the non-inheritance of characters externally impressed during the individual life of parent. The difference between pathological and atavistic variation, *e.g.*, between pithecoïd atavism and pathological "pithecism." Atavism defined as discontinuous heredity. Three kinds of theromorph:—self-acquired, inherited from an individual in which it was acquired, and strictly atavistic. The latter is always inherited. Discussion of teratology in its relation to variation and heredity.

WARYNSKI, S. Sur la production artificielle des Monstres à cœur double chez les Poulets. Quelques reflexions sur la loi qui règle la constance des formes chez l'Embryon, sa vérification expérimentale. Rec. Z. Suisse, iii, pp. 261-311 ; 61 pp., pl., Genève.

WEISMANN, A. [See Reprod.]

Individual peculiarities impressed by environmental influences on the Metazoan parent are not known to be hereditarily transmitted.

— Zur Geschichte der Vererbungstheorien. Zool. Anz. ix, pp. 344-350.

* — Zur Annahme einer Continuität der Keimplasmas. Ber. Freiburg Ges. Bd. i, Heft 4.

WOLFF, M. Ueber erbliche Uebertragung parasitärer Organismen. Virchow's Archiv. cv, pp. 192-196.

Direct inheritance of micro-organisms, very rare at least.

* ZIEGLER, E. Können erworbene pathologische Eigenschaften vererbt werden, und wie entstehen erbliche Krankheiten und Missbildungen? Jena: Fischer.

(c.) SPECIAL SUBJECTS.

1. *Protoplasm*.*

BERTHOLD, G. Studien über Protoplasma-mechanik. Leipzig : Felix, 8vo, 332 pp., 7 pls.

Structure and physiology of protoplasm, with special reference to vegetable cells.

*BÜTSCHLI, O. Kleine Beiträge zur Kenntniss einiger mariner Rhizopoden. Morph. JB. xi, pp. 78-101, 2 pls.

Confirmation of his opinion that the protoplasmic structure is really not reticulate, but honeycombed.

CARNOY, J. B. [See Cell.] Summary, La Cellule, iii, fasc. 1, p. 90.

*DEGAGNY, C. Synthèse de la matière organisée vivante ; formation des protoplasmes, à partir d'une matière azotée soluble et des hydrates de carbone. C.R. cii, p. 718.

*FLAUM, M. Les problèmes de la vie et les recherches chimiques. Wszzechswiat, No. 14.

FUCHS, R. Mikromechanische Skizzen. Kosmos, xviii, pp. 183-199, 285-302, & 416-441.

Inquiry into the molecular dynamics of protoplasm, with special emphasis on the contraction and expansion of the surfaces of contact between two soft bodies, and application of results to structure of protoplasm, contractility of muscle, nutrition of amœbæ, movement of *Myxomycetes*, movement of Pseudopodia, motion of Diatoms, circulation of protoplasm, and motion of cilia. The protoplasm exhibits a state of hunger and a state of satiety ; adhesion towards an external body increases with the hunger of the protoplasm and the nutritive content of the external body ; different protoplasms exhibit reduced adhesion.

GEDDES, P. Theory of Growth, Reproduction, Sex, and Heredity. P. R. Soc. Edinb. pp. 911-931.

These problems discussed in terms of anabolism and katabolism of protoplasm.

*HANSTEIN, J. v. Das Protoplasma als Träger der pflanzlichen und thierischen Lebensvorrichtungen. Heidelberg : Winter, 8vo, 2nd Ausg., 187 pp.

KÖLLIKER, A. [See Heredity.] Structure of the Idioplasm.

LOEW, O. On a Chemical Difference between Living and Dead Protoplasm. Rep. Brit. Ass. (1885), pp. 1075-1077.

The albumen of the living protoplasm contains aldehyd groups, which are lost in the albumen of the dead protoplasm by atomic displacement. These aldehyd groups demonstrated by action upon alkaline silver solution.

* See also Cell, Oogenesis, Protozoa, and histological papers under separate headings.

2. *Morphology and Physiology of the Cell.**

°ALTMANN, R. Studien über die Zelle. Heft 1. Leipzig : 1886, 53 pp., 1 pl.

Granules in cells of animal tissues increasing by division.

AOYAMA, —. Indirecte Kerntheilung in verschiedenen Neubildungen. Virchow's Archiv. cvi, pp. 568–575, 1 pl.

°ARNOLD, J. Ueber Kernteilung und vielkernige Zellen. Virchow's Archiv. xcvi.

BAMBEKE, C. VON. Des déformations artificielles du noyau. Arch. Biol. vii.

°BELLONCI, G. Sui nuclei polimorfi delle cellule sessuali degli anfibi. Bologna : 1886.

BERTHOLD, G. [See Protoplasm.]

General morphology, cell division, free cell formation, &c., mainly with reference to vegetable cells.

BIZZOZERO, G. Ueber die Regeneration der Elemente der Gewebe unter pathologischen Bedingungen. CB. med. Wiss. xxiv, pp. 81–84.

°BRIGIDI, —, & TAFINI, —. Lo Sperimentale, 1886. Cited by Cornil, V.

°BÜCHNER, L. Physiologische Bilder. [See Books.] Including Die Zelle, &c.

BÜTSCHLI, O. Bemerkungen zu der Schrift des Herrn Arnold Brass. "Die Organisation der thierischen Zelle." Morph. JB. xi, pp. 229–242.

CARNOY, J. B. La Cytodiérèse chez les Arthropodes. La Cellule, i (1885), pp. 191–440, 8 pls. [See also Oogenesis.]

In *Arthropoda* stenosis (direct division) occurs, and may be effected with the aid of a cellular plate, as in plants. It may occur alongside of, or after, or alternately with, indirect division. Intermediate between kinesis and stenosis, internal or imperfect kinesis occurs. The observed phenomena of kinetic division vary from Flemming's general scheme. In regard to maturation, &c., of *Ascaris*, conclusions widely different from those of Nussbaum and Van Beneden. General conclusion that plasmodieresis is identical in the animal and in the vegetable cell. Observations on nucleus, protoplasm, cell-membrane.

——. Réponse à la note de M. Flemming, insérée dans le Zool. Anz., No. 216. Zool. Anz. ix, pp. 500–502.

CORNIL, V. Sur le procédé de division indirecte des noyaux et des cellules épithéliales dans les tumeurs (Epithéliome, carcinome, papillome). Arch. Phys. viii, pp. 310–324, 2 pls.

Chromatic substance dividing into three or even five lobes.

* See also Cell, Oogenesis, Protozoa, and histological papers under separate headings.

[CORNIL, V.] Sur un procédé de division indirecte des cellules par trois dans les tumeurs. C.R. ciii, pp. 78-80, 2 figs.

In cells of two epitheliomatous tumours division by threes, trilobate chromatic filament dividing into three distinct plates.

DALLINGER, W. H. Researches on Cell-nucleus. J. R. Micr. Soc. vi, pp. 195-207, 3 pls.

DENYS, J. La cytodierèse des cellules géantes et des petites cellules incolores de la moelle des os. Cellule, ii, Fasc. 2, pp. 245-286, 2 double pls.

The giant cells divide normally, both by stenosis (internal, unequal, multiple) and by kinesis. The two modes are not mutually exclusive. The kinetic method is not binary, but always multiple. No observation of the fragmentation described by Arnold.

ERRERA, L. Sur une condition fondamentale d'équilibre des cellules vivantes. C.R. ciii, pp. 822-824.

Molecular physics of cell.

FLEMMING, W. Zur Orientirung über die Bezeichnung der verschiedenen Formen von Zell- und Kernteilung. Zool. Anz. ix, pp. 109-112.

In reference to Carnoy's terminology.

—. Beiträge zur Kenntniss der Zelle. 59 Versammlg. Naturf. Berlin, 1886 [*vide* Arch. mikr. Anat. xxix, p. 87].

FRENZEL, J. Das Idioplasma und die Kernsubstanz (see Heredity).

Morphology of cell. Import of nucleus, its striking absence in numerous cases, existence of diffused "pseudochromatic" substance, and probable morphological solution of the nucleus in various cells. Bibliography of "pseudochromatic elements."

—. Zur feineren Bau des Wimperapparates. Arch. mikr. Anat. xxvii, pp. 53-80, 1 pl.; J. R. Micr. Soc. 1887, pp. 49 & 50.

Detailed study of histology of cilia. In many cases 8 parts are distinguished! Function to protect the sensitive and otherwise naked cell.

*GAGE, S. H., & GAGE, S. P. Amoeboid Movement of Cell-nucleus. Science, vii, p. 35; J. R. Micr. Soc. vi, p. 217.

In white blood corpuscles of *Necturus*, nucleus exhibits distinct and vigorous movements.

GARBINI, A. Di un nuovo metodo per doppia colorazione. Zool. Anz. ix, pp. 26-29.

Differentiations in protoplasm demonstrated by double staining.

*GILLIS, P. Prolifération de la Cellule par Karyokinèse. Concours d'aggrégation. Paris: Delahaye & Leerosmer, 8vo, 120 pp.

*GIOVANNI, S. Archivio per le sc. mediche, x (1886).

Quoted by Cornil, V., as observing abundant indirect division in cells of mucosa in inflammatory and neoplastic lesions of skin.

1886. [VOL. XXIII.]

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GUIGNART, L. Sur quelques phénomènes de la division du noyau cellulaire. C.R. cii, pp. 1036-1038.

GRUBER, A. [See Reprod.].

Nucleus essential to reproduction and regeneration of *Protozoa*. "The nucleus is the most important and the species-preservative constituent of the cell, and to it is justly ascribed the highest importance in the processes of fertilization and inheritance." Conditions of cell-division.

HEATHCOTE, F. G. The Early Development of *Julus terrestris*. P. R. Soc. xl, pp. 73-76; Q. J. Micr. Sci. xxvi, pp. 449-470, 2 pls.

Inter alia—Long retention of primitive connection of cell with cell, and layer with layer.

HENKING, H. Untersuchungen über die Entwicklung der Phalangiden. Z. wiss. Zool. xlv, pp. 86-175, 4 pls.

Free origin of nuclei in protoplasm. Inaccuracy of dogma—*Omnis nucleus e nucleo*. Ova without nuclei. Disappearance of nuclei.

JAWOROWSKI, A. Multiplication endogène des cellules. Arch. slav Biol. i, pp. 641-651; Ann. Acad. Sc. Cracovie, 1885; J. R. Micr. Soc. 1887, pp. 48 & 49.

Endogenous cell-multiplication in reproductive organs of *Chironomus*, mesoderm of chick, developing muscle in fish-embryos, &c. Novel views as to cell, nucleus, nucleolus, &c.

——. Nucleus: its Origin and Import. *Ibid*.

JOURDAN, ET. Structure de la vésicule germinative du *Siphonostoma diplochætos* Otto. C.R. cii, pp. 1494-1496.

Independence of nucleoli and nuclear reticulum. The principal nucleolus seems able to produce, even when the ovule is in state of repose, a number of chromatic bodies which detach themselves into the nuclear substance.

JUST, A. Histologie und Physiologie des Flimmer-Epithelium. Biol. Centralbl. vi, pp. 123-126.

Modifications of ciliated areas after injury of pharyngeal and oesophageal mucosa of frogs. Disappearance, reduction, or fusion of cilia.

KOSSEL, A. Weitere Beiträge zur Chemie des Zellkerns. Hoppe-Seyler's Zeitschr. f. Physiol. Chemie x, pp. 248-264.

Nuclein of yolk of egg differs from nuclein of cell-nucleus in absence of nitrogenous bases. Broken up with boiling dilute acids, does not form guanine and hypoxanthin. Description of "adenin," a decomposition product of nuclein, intermediate in the formation of hypoxanthin; found in pancreatic cells, also in other plant and animal tissues.

LEE, A. BOLLES. Carnoy's Cell Researches. Q. J. Micr. Sci., April, 1886, p. 481.

*LIST, J. H. Die Rudimentzellentheorie und die Frage der Regeneration geschichteter Pflaster-epithelien. Wien: large 8vo, 5 pp.

[LIST, J. H.] Ueber den Bau, die Secretion und den Untergang von Drüsenzellen. Biol. Centralbl. v, pp. 698-704.

—. Der Structur der Becherzellen. Biol. Centralbl. vi, pp. 592-596; Arch. mikr. Anat. xxvii, pp. 481-588, 6 pls.; J. R. Micr. Soc. 1887, pp. 47 & 48.

Histology and physiology of goblet cells.

NISSEN, F. Ueber den Verhalten der Kerne in den Milchdrüsen bei der Absonderung. Arch. mikr. Anat. xxvi, pp. 337-342, 1 pl.; J. R. Micr. Soc. vi, pp. 215 & 216.

In mammary gland-cells, degeneration and disruption of nuclei, which in all probability go to form the casein of the secretion.

OBRUZ, A. Sur les cellules géantes tuberculeuses. Arch. Slav. Biol. ii (3) pp. 402-425, 1 pl.

These cells are not units, but conglomerations of hypertrophied cells.

PFITZNER, W. Zur Kenntniss der Kerntheilung bei den Protozoen. Morph. JB. xi, pp. 454-467, 1 pl.

Identity between Protozoan and Metazoan nuclei.

—. Zur morphologischen Bedeutung des Zellkerns. T. c. pp. 54-77, 1 pl.

"The nucleus is always a perfectly independent closed structure within the cell. Karyokinesis is the expression of a process occurring within the nucleus, in which no morphological elements of the cell-substance take any active share."

—. Zur pathologischen Anatomie des Zellkerns. Virchow's Archiv. ciii, pp. 275-300, 1 pl.

Description of various pathological phenomena in nucleus of cells; senile degeneration especially. Also general notes on nucleus.

PLATNER, G. Ueber die Entstehung des Nebenkerns und seine Beziehung zu Kerntheilung. Arch. mikr. Anat. xxvi, pp. 343-369, 1 pl.

Origin and history of accessory nuclear body or nebenkern. It arises (in spermatogonium of *Helix*) as a protrusion from the nucleus. History followed to the spermatide, where it probably helps to form the spiral membrane.

*—. Die Karyokinese bei den Lepidopteren als Grundlage für eine Theorie der Zell-Theilung. Intern. J. Anat. Hist. iii, pp. 341-398, 2 pls.; also separately, Leipzig: Thieme.

RAUBER, A. Ueber die Mitosen des Medullarrohres. Zool. Anz. ix, pp. 159-164.

Direction and disposition of divisions.

—. Mitosen im Medullarrohre. Arch. mikr. Anat. xxvi, pp. 622-644, 1 pl.

Disposition and direction of nuclear division in spinal cord of Batrachians.

SCHIMKEWITSCH, W. Sur l'existence de cellules blastodermiques privées de noyaux. Arch. slav. Biol. ii, pp. 26-28.

SEDGWICK, A. [See Oogenesis.]

Continuity of protoplasm in adult; persistence of primitive state.

SPENGEL, J. W. *Schwerkraft und Zelltheilung.* Biol. Centralbl. v, pp. 663-668.

Historical.

ST. GEORGE, V. LA VALETTE. *Spermatologische Beiträge.* Arch. mikr. Anat. xxviii (1886), p. 8.

History of "Neben-kern."

THIN, G. *Nucleus in Frog's Ovum.* Rep. Brit. Assoc. (1886).

Behaviour of nucleus in segmenting ovum.

*VARIOT, G. *Éléments figurés du Sang,* Anatomie et Physiologie. Paris: 4to, 145 pp.

WALDEYER, W. *Ueber Karyokinese.* Deutsch. medicin. Wochenschrift, No. 1-4, Jan. 1886.

Detailed historical review of recent researches.

WERNER, W. *Ueber Theilungsvorgänge in den Riesenellen des Knochenmarkes.* Virchow's Archiv. cvi, pp. 354-377, 1 pl.

The giant cell as such, not a stage or product of a degenerative process. They undergo a mode of division which has nothing in common with that of mitosis. Confirmation of Arnold.

*WIELOWIEJSKI, A. *Ueber den Bau und die Bedeutung der thierischen Zelle.* Tagebuch iv. Zusammenkunft Naturf. u. Aerzte Posen, p. 21.

WILL, L. [See Oogenesis.] *Relation of Cell and Nucleus.*

Protoplasmic body of ovum grows centrifugally at expense of budding nucleus. No "dualism" in the cell, nor real distinction between nucleus and protoplasm.

WOODHEAD, G. S., & HARE, A. W. *Relations of Micro-organisms to Tissue Elements.* J. Anat. Phys. xx, pp. 76-99.

Pathological processes discussed directly in relation to cellular biology.

ZACHARIAS, O. *Ueber einen Fall von Kernverschmelzung bei Furchungskugeln.* Zool. Anz. ix, pp. 400-403.

Fusion of first two segments of dividing ovum of *Limnaeus*; in deficient water, nuclei even approached one another.

— [See Reprod.]

Nucleus in male and female cells.

ZELINKA, C. *Studien über Räderthiere.* Z. wiss. Zool. xlv, pp. 396-507, 4 pls. *Inter alia*—mature ovarian and yolk gland form a syncytium.

3. *Oogenesis.*

GULDBERG, G. A. *Beitrag zur Kenntniss der Eierstockeier bei Echidna.* SB. Jen. Ges. (1885), pp. 113-122, 1 pl.

Resemblance to Sauropsidan ova.

VAN BAMBEKE, C. Contribution pour servir à l'histoire de la vésicule germinative. Bull. Ac. Belg. xi, pp. 14-28.

Criticism of v. Wielowiejski. The distinctive characters of the germinal vesicle.

BEDDARD, F. E. Observations on the Ovarian Ovum of *Lepidosiren* (*Protopterus*). P. Z. S. 1886, pp. 272-292, 2 pls.

——. Ovarian Ovum of the *Dipnoi*. Zool. Anz. ix, pp. 635-637.

——. Observations on the Development and Structure of the Ovum in the *Dipnoi*. P. Z. S. 1886, p. 505.

Two kinds of structures derived from the germinal epithelium: (a) an ovum, the equivalent of a single cell; (b) multicellular or plasmodial, the resultant of a large number of cells.

BELLONCI, G. Intorno ad un principio di segmentazione e ad alcuni fenomeni degenerativi degli ovuli ovarici del topo e della cavia. Mem. Acc. Bologn. (1885), pp. 368 & 369.

*——. Intorno alla cariocinesi nella segmentazione dell'ovo di *Axolotl*. Atti Ac. Rom. xix, pp. 3-7.

——. Intorno al modo di genesis di un globulo polare nell'ovulo ovarico di alcuni mammiferi (topolino, cavia, coniglio). Mem. Acc. Bologn. (1885), pp. 363-367, 1 pl.

BLOCHMANN, F. Über die Reifung der Eier bei Ameisen und Wespen. Festschrift. Heidelberg: 1886. Biol. Centralbl. vi, pp. 554-559 [Zool. Anz. Nos. 237 & 655]; J. R. Micr. Soc. 1887, pp. 70 & 71.

Not corroboratory of Wills' "ooblast" observations; neighbour nuclei appearing round surface of nucleus have no connection with follicle. Peculiar bacteroid-like masses in ovum and embryo. No reception of formed yolk particles by the egg from outside. Hints of polar cells; distinctly in *Musca vomitoria*.

CARNOY, J. B. La cytodièrese de l'œuf. La vésicule germinative et les globules polaires et l'*Ascaris megalocephala*. La Cellule, ii, pp. 1-76, 3 double pls., iii, pp. 1-103, 3 pls.

*COUTANCE, A. Les Théories de la Vie jugées dans l'œuf. Paris: 8vo, 105 pp.

GEDDES, P. [See Reprod.]

A predominant anabolism effects the differentiation of female elements.

HALLEZ, P. Loi de l'orientation de l'embryon chez les Insectes. C.R. ciii, pp. 606-608.

"The egg-cell has the same orientation as the maternal organism which produces it; it has a cephalic pole and a caudal pole, a right side and a left side, a dorsal surface and a ventral surface; and the different surfaces of the ovum coincide with the corresponding surfaces of the embryo."

HEAPE, W. The Development of the Mole—The Ovarian Ovum. Q. J. Micr. Sci. xxvi, pp. 157-174, 1 pl.

Description of immature and mature ova.

HENKING, H. Untersuchungen über die Entwicklung der Phalangiden. Z. wiss. Zool. xlv, pp. 86-175, 4 pls.

Observations on free nuclear formation. Ova without nuclei. Disappearance of nuclei.

HERTWIG, O. Über den Befruchtungs- und Theilungsvorgang des thierischen Eies unter den Einfluss äusserer Agentien. Jen. Z. Nat. xx, supp. pp. 17-24.

JAWOROWSKI, A. [See Cell.] *Chironomus*.

JHERING, H. v. [See Reprod.]

Ovum primitively forms multiple embryos; the polar cells are morphologically nothing less than abortive germs.

KORSCHILT, E. Zur Frage der Ursprung der verschiedenen Zellenelemente d. Insektenovarien. Zool. Anz. viii (1885), pp. 581 & 599, ix (1886), p. 256.

—. Ueber die Entstehung und Bedeutung der verschiedenen Zellenelemente des Insektenovariums. Z. wiss. Zool. xliii, pp. 537-720, 5 pls.; J. R. Micr. Soc. 1887, pp. 71 & 72.

Ova, nutrient cells, and epithelium all arise from similar indifferent elements in first rudiment of ovarian tubes. The nutritive cells are a secondary adaptation. "Ooblast" theory denied.

—. Ein weiterer Beitrag zur Lösung der Frage nach dem Ursprung der verschiedenen Zellenelemente der Insektenovarien. Zool. Anz. ix, pp. 256-263.

Corroboration of previous results, and criticism of those of Will, Schneider, and v. Wielowiejski.

KRÄPELIN, K. Bryozoen. Biol. Centralbl. vi, pp. 599-602, 59 vers. Naturf. Berlin: 1886.

*LABOULBÈNE, A. Note sur les œufs remarquable d'un Insect Diptère. Ann. Soc. Ent. Fr. vi, pp. 285 & 286.

LIST, J. H. Ueber die Entstehung des Dotters und Eizellen bei *Orthezia cataphracta*. Biol. Centralbl. vi, pp. 485-488.

(1) Yolk flakes from modified epithelial cells of terminal chamber, which break down to form yolk of ovum. (2) Ova from modification of one or more cells of epithelium of the egg-chamber.

*MCMURRICH, J. P. Embryology of Prosobranch Gasteropods. Stud. Biol. Lab. J. Hopkins Univ. iii, pp. 403-405, 4 pls.

Inter alia—Various proportions of eggs (*a*) which develop and (*b*) which break down and form food.

*PERACCA, [CONTE] MARIO DE. Osservazioni intorno alla deposizione ed mentazione artificiale delle ova dell' *Elaphis quateradiatus*, Latr. Boll. Mus. Zool. Torino, i, No. 16.

PÉREZ, J. Sur l'histogénèse des éléments contenus dans les gaines ovigères des Insectes. C.R. cii, pp. 181-183 & 557-559.

The indifferent cell of the ovariole, instead of being transformed directly into an ovule, proliferates and forms endogenously a constant

number of cells. These are liberated by rupture, the inferior becomes the ovule, the others are vitellogenic.

*PLAGNIOL, E. DE. Embryologie de l'Œuf du Ver à soie. Privas. 8vo, 55 pp., pl.

PLATNER, G. Zur Bildung der Geschlechtsprodukte bei Pulmonaten. Arch. Mikr. Anat. xxvi, pp. 599-621, 2 pls.; J. R. Micr. Soc. vi, pp. 410-412.

Oogenesis of *Arion* and *Helix*. Polar globules in *Arion*. Three always—as result of division of one of the original two. Process consists essentially in removal of nuclear constituents, to be replaced by male nucleus.

SABATIER, A. Sur la morphologie de l'ovaire chez les Insectes. C.R. cii, pp. 61-63.

In insect ovaries with large nutritive cells the primitive ovule gives rise, endogenously within its protoplasm, independent of germinal vesicle, to the nuclei of the follicular, and later to those of the nutritive cells. Both are eliminated elements.

——. Sur la morphologie de l'ovaire chez les Insectes. T. c. pp. 267-279 & 441-443.

SCHAUINSLAND, H. Die Excretions- und Geschlechts-organe der Priapuliden. Zool. Anz. ix, pp. 574-577.

*SCHULTZE, O. Ueber Reifung und Befruchtung des Amphibieneies. Anat. Anz. i, pp. 149-152.

SEELIGER, O. Die Knospung der Salpen. Jen. Z. Nat. xix, pp. 573-677, 10 pls.

Inter alia—Follicular cells not from ovum,—opposition to observation of Fol, Ulianin, Roule, Sabatier, &c. The cells which form others by division or by budding are not yet to be reckoned as ova. Theoretical considerations as to follicular cells, polar cells, &c., and the general alternation of generations in *Metazoa*.

SEDGWICK, A. The Development of the Cape Species of *Peripatus*. Q. J. Micr. Sci. xvi, pp. 175-212, 3 pls.

Sponge-like structure of ovum; description of polar globules; continuity of nuclear and extra-nuclear reticulum; nucleus of fertilised ovum differs from the cell protoplasm only in the way the chromatin of the network behaves; the endoderm cells at first without distinct nucleus; the segmented ovum a syncytium.

STUHLMANN, F. Die Reifung des Arthropodeneies. Biol. Centralbl. vi, pp. 397-402; Ber. Freiburg Ges. (1886).

Some of uniform nuclei of germinal layer differentiate towards ova; germinal vesicle moves to periphery, and seems to get flattened against follicular epithelium. No passage of chromatin bodies from nucleus, as in many insect ova. Apparent absence of polar cells in large ova rich in yolk. Expulsion of polar cells at a very early stage, before egg

half its size. Germinal vesicle amœboid in large, richly-equipped ova. "Yolk nuclei" not from germinal vesicle, though arising near it, simply nutritive yolk concretions.

TESSIN, G. Ueber Eibildung und Entwicklung der Rotatorien. *Z. wiss. Zool.* xlv, pp. 273-302, 2 pls.

In describing maturation of ova, notes, *inter alia*, distinct traces of formation of polar cells.

THOMSON, J. A. Recent Researches in Oogenesis. *Q. J. Micr. Sci.* xxvi, pp. 591-606.

Historical review of recent observations on polar bodies and follicular cells.

TICHOMIROFF, A. [See Reproduction.]

Comparison of analysis of ova of *Bombyx mori* before and after incubation. The ova lose in developing 7 per cent. of water and 3 per cent. solid material (principally glycogen and fat).

WEISMANN, A. Richtungskörper bei parthenogenetischen Eiern. *Zool. Anz.* ix, pp. 570-573.

Polar cells in *Polyphemus oculus*, *Byotrephes longimanus*, *Moina para-doza*, *Daphnia longispina*, &c.

WIELOWIEJSKI, H. v. Zur Kenntniss der Eibildung bei der Feuerwanze. *Zool. Anz.* viii (1885), p. 367.

——. Zur Morphologie des Insectenovariums. *Zool. Anz.* ix, pp. 132-139.

Inter alia, corroboration of previous opinion that there is no transition between elements of terminal chamber and young ova.

——. Ueber die Entstehung der Dotterelemente im Thierei. *Tagebuch d. 4 Zusammenkunft poln. Naturf. u. Aerzte Posen*, p. 17.

WILL, L. Die Entstehung des Eies von *Colymbetes fuscus*, L. *Z. wiss. Zool.* xliii, pp. 329-368, 2 pls.; *J. R. Micr. Soc.* vi, pp. 764 & 765.

Colymbetes fuscus. Nucleus of primordial ovum gives rise to large daughter-nuclei—the nuclei of giant epithelial cells (yolk- or nutritive-cells). The follicular ovum is the primordial ovum after the loss of the daughter cells.

4. *Spermatogenesis.*

*BALLOWITZ, E. Zur Lehre von der structur der spermatozoen. *Anat. Anz.* i, pp. 363-376.

*BELLONCI, G. Sui nuclei polimorfi delle cellule seminali delle anfi-bi. *Bologna*: 1886.

BENDA, C. Samenentwicklung bei Säugethieren. *Arch. Anat. Phys.* 1886, pp. 186 & 187; *J. R. Micr. Soc.* vi, pp. 209 & 210.

Emphasizes the activity of the "foot-cell," in division and retraction. Differs conspicuously from Merkel and Sertoli, and agrees generally with v. Ebner and H. H. Brown.

CUNNINGHAM, J. T. [See Reprod.]

Description of immature testis of *Myxine*.

GEDDES, P. Art. Reproduction; *Encycl. Brit.*

Historical and theoretical.

—, & THOMSON, J. ARTHUR. History and Theory of Spermatogenesis. P. R. Soc. Edinb pp. 803-823, 1 pl.

History of research, and attempt to rationalize the various modes of Spermatogenesis, by comparing them with parallel processes in ovum segmentation.

— . [See Reprod.]

A predominant katabolism effects differentiation of male elements.

GILSON, G. Etude comparée de la spermatogénèse chez les Arthropodes. La Cellule, i & ii, pp. 83-239, 15 double pls.

First stage: A nucleated plasmodium; the nuclei with fragmented nuclear element, multiplying by stenosis, until at a certain period individualization occurs, and primary "métrocytes" are formed; in these the nuclear element is, sooner or later, reformed, and becomes filamentous; karyokinesis sets in, and by binary segmentation ever smaller cellules spermatiques are formed. *Second stage*: In the protoplasm a special, but variable hyaline vesicle is formed; protoplasmic processes often develop; the nucleus changes in form, and also in contents, and eventually becomes homogeneous. *Third stage*: Formation of two kinds of spermatophores in many species; development of spermatid cells into spermatozooids.

HOFFMANN, C. K. Zur Entwicklungsgeschichte der Urogenitalorgane bei den Anamnia. Z. wiss. Zool. xvi, pp. 570-643, 3 pls.

Some general notes on first stages of spermatogenesis.

JENSEN, O. S. Ueber die structure der Samenkörper bei Säugethieren Vögeln und Amphibien. Anat. Anz. i, pp. 251-257.

KRÄPELIN, K. Phylogenie und Ontogenie der Eryozoen. Biol. Centralbl. vi, pp. 599-602; Ber. 59 vers. Naturf. Berlin: 1886.

PLATNER, G. [See Cell.] Arch. mikr. Anat. xxvi, pp. 343-369, 1 pl.; J. R. Micr. Soc. vi, pp. 216 & 217.

With especial reference to the nuclear changes.

— . Zur Bildung der Geschlechtsprodukte bei den Pulmonaten. Arch. Anat. xxvi, pp. 509-621, 2 pls.; J. R. Micr. Soc. vi, pp. 410-412.

(1) Karyokinesis in sperm-cells of *Helix*; origin of accessory nuclear body or nebenkern from the spindle fibres. (2) Spermatogenesis in *Arion*. From the nucleated protoplasm of the reproductive organ there arise (a) primitive ova; (b) spermatogonia and basal cells; (c) nutritive cells furnishing the yolk; and (d) nuclei of the alveolar wall and of the follicular membrane (reserve germs for future reproductive elements).

SCHAUINSLAND, H. Die Excretions- und Geschlechtsorgane der Priapuliden. Zool. Anz. ix, pp. 574-577.

SERTOLI, E. Sur la Caryokinèse dans la spermatogénèse. *Arch. Ital. Biol.* vii, pp. 369-375 ; *Rend. Ist. Lomb.* xviii.

Investigation of karyokinesis in cells of seminiferous canals of ass, dog, cat, rabbit, and rat. The sperms which are formed continually in the seminiferous canals during sexual activity, are presumably developed from the cells which are being incessantly reproduced; but the karyokinesis shows that the elements continuously renovated are the mobile (germinative and seminiferous), and not the fixed (epithelial or ramified) cells; and this is in obvious accordance with Sertoli's long since expressed conclusion that the former, and not the latter, give rise to the sperms.

SPICHARDT, C. Entwicklung der männlichen Geschlechts-organe in Lepidopteren. *Verh. Ver. Rheinl.* xliii, pp. 1-34, 1 pl. ; *J. R. Micr. Soc.* vi, pp. 968 & 969.

Inter alia, observations on spermatogenesis.

ST. GEORGE, V. LA VALETTE. Spermatologische Beiträge. *Arch. mikr. Anat.* xxvii, pp. 1-12, 2 pls. ; *J. R. Micr. Soc.* vi, pp. 590 & 591.

Corroboration of his law of spermatogenesis in *Blatta germanica*. Origin of accessory nuclear body from the cyto-microsomata in the spermatocytes, and of these from the remnants of the spindle fibres. Transitory head of sperm from nucleus of spermatide, tail from protoplasm, middle portion from accessory body.

——. Spermatologische Beiträge. *Arch. mikr. Anat.* xxvii, pp. 1-13, 4 pls.

In Beetles (especially *Phratora vitellinae*) primitive sperm-cells, spermatogonia, spermatocysts of spermatocytes, spermatides, and spermatozoa follow one another as usual. In spermatocyte, accessory nuclear body (nebenkern) appears as a simple thickening of the cytoplasm, is closely associated with mitosis, and forms, with nucleus, the head of sperm.

——. Spermatologische Beiträge. *Arch. mikr. Anat.* xxvii, pp. 385-396, 3 pls. ; *J. R. Micr. Soc.* vi, p. 935.

Later stages in ontogeny of sperms in Amphibians. Corroboration of author's law of spermatogenesis.

STUHLMANN, FR. Beiträge zur Anatomie der Männlichen Geschlechtsorgane und zur Spermatogenese der Cypriden. *Z. wiss. Zool.* xlv, pp. 536-569, 1 pl.

"The testicular tubules of young forms contain only syncytium and large cells; afterwards small cells, spindle-cells, and spermatozoa appear. The nuclei of the syncytium at apex of gland become the germinal-vesicle-like nuclei of the large cells. These divide repeatedly, and the nuclei of the small cells thus arising are spindle-shaped. The nucleus forms the central filament of the sperm. The motion of a spiral fringe brings sperm into upper part of the vas deferens. A hyaline sheath is shed round the sperm, which remains almost motionless within receptaculum seminis of female."

THOMSON, J. A. [See GEDDES, P.]

WIELOWIEJSKI, H. DE. Spermatogénèse chez les Arthropodes. Arch. slav. Biol. ii, pp. 28-36 ; J. R. Micr. Soc. 1887, pp. 69 & 70.

(1) Nuclear filament of spermatocyte breaks up, and does not form head of sperm ; (2) Multinuclear spermatogonia, not from endogenous division (Gilson), but from fusion ; (3) Contradictory observations to many of Gilson's, but in the main corroborating his conclusions.

5. Sex and Reproduction.

BERTHOLD, G. [See Protoplasm.]

Fertilisation. Notes on cellular phenomena of fertilisation.

BORN, G. Biologische Untersuchungen. Arch. mikr. Anat. xxvii, p. 274.

Conditions of hybrid fertilisation in Anura.

*CLIFFORD, J. R. B. Sex of Winter-flying Butterflies. Ent. xix, p. 178.

*COLUCCI, V. Intorno alla regenerazione degli arti e della coda nei Tritoni. Mém. Acc. Bologn. vi, Fasc. 3.

CUNNINGHAM, J. T. Reproductive Elements of *Myxine glutinosa*. Q. J. Micr. Sci. xxvii, pp. 49-56, 2 pls.

A large proportion of immature *Myxine* are hermaphrodite ; the posterior portion of reproductive organ containing testicular capsules, similar to those of male (which is very rare), and with spermatozoa.

*DANILEWSKI, A. J. Ueber die organoplastischen Kräfte der Organismen. Arb. Petersb. Ges. xvi, pp. 79-82.

*DEBIERRE, CH. L'hermaphroditisme, sa nature, &c. Paris : Baillière, 8vo, 11 figs.

DEWITZ, J. Gesetzmässigkeit in der Ortsveränderung der Spermatozoen, &c., und in der Vereinigung derselben mit dem Ei. Arch. ges. Phys. xxxviii, pp. 358-385, 1 pl.

Regularity of sperm movements in circular courses, and mechanism of fertilisation in Cockroach.

*DONATH, J. Johann Weier über den Hermaphroditismus. Virchow's Archiv. civ, pp. 205-208.

Historical, human hermaphroditism.

DÜSING, C. Die Dauer des Lebens bei höheren und niederen Thieren. Kosmos, xix, pp. 42-54 & 123-136.

Review of Weismann, Dönhoff, Goette, Möbius, Minot.

EMERY, C. La luce negli amori delle Lucciole. Bull. Ent. Ital. xviii, pp. 406-411.

Inter alia, differences in the light exhibited by the two sexes.

— Ueber dimorphe und flügellose Männchen bei Hymenopteren. Biol. Centralbl. v, pp. 686-689.

Historical.

*FILACHOW, J. E. De la parthénogénèse. Paris: Pedone Lauriel, 12mo, 78 pp.

*FISCHER, E. Ueber die Drehungsgesetze beim Wachsthum thierischer Organismen. Tag. Deut. Nat. Vers. pp. 139 & 140. Strassburg: Du Mont-Schauberg, 8vo.

FREDERICQ, LÉON. Les mutilations spontanées ou l'autotomie. Rev. Sci. xxxviii, (20) pp. 613-620. (*Cf.* Haliez, P. Bull. Sci. Nord. iv, pp. 342-344.)

FRENZEL, J. Idioplasma und Kernsubstanz. Arch. mikr. Anat. xxvii, pp. 73-128.

Discussion of nature of sexual and asexual reproduction. Real male substance confined to nucleus, without denying as yet that the associated protoplasm may be of importance.

GAULE, J. Bedeutung der Cytozoen. Biol. Centralbl. vi, pp. 345-351.

The Cytozoon is the fundamental element; the formation of embryonic layers, and the differentiation of sex are explicable in terms of cytozoon modifications.

GEDDES, P. Art. Sex. Encycl. Brit. xxi, pp. 720-724.

Interpretation of phenomena in terms of protoplasmic metabolism. The male sex is preponderatingly katabolic; the female anabolic. Discussion of origin, evolution, determination, &c., of sex.

——. Theory of Growth, Reproduction, Sex, and Heredity. P. R. Soc. Edinb. pp. 911-931.

Phenomena of reproduction, &c., rationalised in terms of anabolism and katabolism of protoplasm. Inductive evidence to show that the female sex is in origin, structure, and function, the outcome of preponderant anabolism, and the male of equally emphatic katabolism. Deductive verification of this conclusion. *E.g.*, "In determination of sex, influences inducing katabolism tend to result in production of males, as those favouring anabolism similarly to increase the probability of females." "Evolution of fertilisation from almost mechanical flowing together of exhausted cells, as illustrated in plasmodia, through surviving cases of multiple conjugation to the normal process."

GRUBER, A. Beiträge zur Kenntniss der Physiologie und Biologie der Protozoen. Ber. Freiburg Ges. i (1886), heft. 2; transl. Ann. N. H. xvii, pp. 473-494.

Spontaneous division occurs at optimum of growth, or in rapid succession with diminution of size in unfavourable conditions (in both cases associated with the preponderance of katabolism). "Conjugation brings about nuclear intermixture from both sides, and the nucleoli also copulate."

HALLEZ, P. Loi de l'orientation de l'embryon chez les Insectes. -C.R. ciii, pp. 606-608.

Orientation of ovum identical with that of embryo.

*HENSEL, T. Das Leben. i. Die Fortdauer der Urzeugung. Cristiania: Huseby (1885), 8vo.

HERTWIG, R. Ueber Polyspermie. S.B. Ges. Morph. ii, pp. 1-4.

HERTWIG, O. & R. Experimentelle Untersuchungen über die Bedingungen der Bastardbefruchtungen. Jen. Z. Nat. xix, pp. 121-165.

(1) The success of hybrid fertilisation does not wholly depend on the degree of relationship; (2) it is frequently not reciprocal; (3) the state of the elements is an important condition. The various results depend almost exclusively on the plasticity of the ovum. The hybrid fertilisation occurs the more readily the livelier the sperms, the weaker the ova. The vigorous ovum is the seat of regulative forces which guarantee normal, and hinder hybrid and polyspermic fertilisation. These are efficacious in proportion to the general vitality of the ovum.

— Experimentelle Untersuchungen über Befruchtung. Anat. Anz. i, pp. 11-16; J. R. Micr. Soc. 1887, pp. 44 & 45.

Effect of chloral hydrate on fertilised ova of *Strongylocentrotus lividus*—hinders normal conjugation of the nuclei. Maturation and fertilisation are associated with fundamental protoplasmic changes.

HORST, R. Zur Regenerations litteratur. Zool. Anz. ix, p. 50.

HYATT, A. Larval Theory of the Origin of Tissue. Am. J. Sci. pp. 332-347; Ann. N. H. xviii, pp. 193-209. [Cf. P. Bost. Soc. 1884.]

As in 1884, "tissue cells of *Metazoa* are similar to asexual larvæ, and are related by their modes of development to the *Protozoa*."

JAWOROWSKI, A. [See Cell.]

Rapid death of *Chironomus* after reproduction due to repletion of abdominal cavity with blood after expulsion of elements. Pædogenesis due to rupture of the incompletely developed ovarian membrane and the liberation of ovules into the body cavity, where, in richly nutritive environment, they are able to develop into larvæ without fertilisation.

JHERING, H. v. Generationswechsel in Säugethieren. Biol. Centralbl. vi, pp. 532-539; J. R. Micr. Soc. 1887, p. 44.

In *Praopus* eight embryos from one germ. Notice of other cases. The origin of multiple embryos from a single ovum is the primitive condition, the development of only one is secondary and adaptive. Revised scheme of modes of reproduction. I Hologenous: fertilised ovum develops, with or without metamorphosis, into a single individual. II Merogenous: ovum forms two or more individuals (a) like parent in structure and reproduction—temnogenesis; (b) metagenesis, (1) calyco-genesis in *Salpæ* and *Medusæ*, (2) pædogenesis in *Cecidomyiæ*, (3) heterogenesis, with both generations sexual, or one or several parthenogenetic.

JOURDAIN, S. Blastogénèse. C.R. ciii, pp. 1086-1088.

Blastogenesis continuous during whole life of stock (*Botrylloides rubrum*) only accelerated in post-larval life. Buds of *B. rubrum* at every stage are hermaphrodite at first. In cold season both glands atrophy; later on, male gonad alone persists; in warm weather, both kinds of gonads completely developed.

KORSCHOLT, E. Ueber die geschlechtliche Fortpflanzung der Einzelligen und besonders der Infusorien. *Kosmos*, xix, pp. 438-452.

Review of recent researches.

—. Ueber die Teilbarkeit und das Regenerationsvermögen einzelliger Tiere. *Kosmos*, xix, pp. 266-274.

Review of Gruber, Nussbaum, &c.

*LAULANIÉ, F. Development and Significance of the Germinal Epithelium in the Testicle of the Chick. *Bull. Soc. Toulouse*, xx, pp. 13-16; *J. R. Micr. Soc.* 1887, p. 210.

Resemblance in development of the germinal epithelium in the two sexes—another argument in favour of an organic and primitive hermaphroditism.

MAUPAS, E. Sur la multiplication de la *Leucophrys patula*, Ehr. *C.R.* ciii, pp. 1270-1273.

Relation between varying nutrition and modes of multiplication. [See *Protozoa*.]

—. Sur la conjugaison des Paramécies. *T. c.* pp. 482-484, &c.

Paranucleus hermaphrodite, becoming differentiated at reproductive epochs, eliminating certain elements, and specialising a fertilising and fertilised portion, the former being mutually exchanged. [See *Protozoa*.]

*MICK, J. Parthenogenesis bei Käfern. *Ent. Nachr.* 1886, p. 200; and see *ibid.*, pp. 315 & 316.

PLATE, L. Untersuchung einiger an den Kiemen des Gammarus pulex lebenden Ectoparasiten. *Z. wiss. Zool.* xliii, pp. 175-241, 2 pls.

Conjugation of Infusorians restores balance between cyto- and nucleoidioplasm. The cell idioplasm may pass into that of nucleus.

PLATNER, G. Ueber die Befruchtung bei *Arion empiricorum*. *Arch. mikr. Anat.* xxvii, pp. 32-72, 2 pls.; *J. R. Micr. Soc.* vi, pp. 773-774.

External and internal phenomena of fertilisation in *Arion*. Sperm usually enters at vegetative pole. If a second sperm enters, it disappears. Details of nuclear changes. Polar cells occasionally penetrated by spermatozoa.

RAUBER, A. Furchung und Achsenbildung. *Zool. Anz.* ix, pp. 157-159.

The degree of constancy with which the direction of the first line of segmentation is at right angles to the future longitudinal axis.

*REUTER, J. Ein Beitrag zur Lehre vom Hermaphroditismus. *Verh. Ges. Würzb.* xix, pp. 13-60.

ROUX, W. Beiträge zur Entwicklungs-mechanik des Embryo. *Z. f. Biol.* xxi, pp. 1-118; *J. R. Micr. Soc.* vi, pp. 943 & 944.

Mechanics of development. Formal development of ovum independent of gravity. Influence of electrical stimulus and mechanical injury. Frog ova pricked with needle, so that some material lost, develop into smaller moribund forms. Definite injuries to ovum produce definite defects in embryo.

*SABATIER, A. Recueil des Mémoires sur la Morphologie des éléments sexuels et sur la nature de la sexualité. Paris: Delahaye & Lecrosmer, 273 pp., 2 pl.

SEDGWICK, A. Development of the Cape Species of *Peripatus*. Q. J. Micr. Sci. xxvi, pp. 175-207, 3 pls.

Important observations on segmentation and syncytial character of the embryo. "Embryonic development must rather be regarded as a multiplication of nuclei and specialisation of tracts and vacuoles in a continuous mass of vacuolated protoplasm."

SEELIGER, O. [See Oogenesis.]

The alternation of generations in *Metazoa*.

SPENGLER, J. W. Bastardbefruchtung. Biol. Centralbl. v, pp. 692-695.

Review of (1885) researches of O. & R. Hertwig.

SUTTON, J. B. On Atavism. P. Z. S. 1886, pp. 551-558.

Primitive hermaphroditism. Non-development of secondary sexual characters latent in females, explained in terms of correlation of organs.

—. [See Evolution.]

Hermaphroditism primitive. Hypertrophy is one of the causes of division of sexes. "Reproduction in vertebrata, so far as is known, is impossible unless hypertrophy of one set of organs occurs."

TICHOMIROFF, A. Die künstliche Parthenogenese bei Insecten. Archiv. Anat. u. Physiol. (Physiol. Abth.), 1886, Suppl. pp. 35 & 36. J. R. Micr. Soc. 1887, 73 pp.

Artificial parthenogenesis of *Bombyx mori* induced by mechanical and chemical stimuli—rubbing with a brush or dipping in concentrated sulphuric acid. In both cases a percentage of the stimulated ova developed.

WEISMANN, A. Die Bedeutung der sexuellen Fortpflanzung für die Selektions-Theorie. Jena: G. Fischer.

Sexual reproduction the most important factor in variation. Conjugation effects not a rejuvenescence, but a strengthening of the forces of the organism in relation with reproduction, when from external causes the growth of the single animal to the size necessary for reproduction is not possible.

WILCKENS, M. Ueber das Geschlechtsverhältniss und die Ursachen der Geschlechtsbildung in Haustieren. Biol. Centralbl. vi (1886), p. 15; Landw. Jahrb. xv. Berlin: 1886.

WILL, L. Die Entstehung des Eies von *Colymbetes fuscus*, L. Z. wiss. Zool. xliii, and ante.

Primitive hermaphroditism of ovum (see Oogenesis). The giant and smaller epithelial cells are historically interesting, being homologous with the cells which in the male form spermatozoa, and indicating the primitive hermaphroditism of the primordial ovum.

WOODHEAD, G. S., & HARE, A. W. Relations of Micro-organisms to Tissue Elements. J. Anat. Phys. xx, pp. 76-99.

Inter alia, "The stimulus applied by the presence of micro-organisms,

or their chemical products, acts in a manner comparable to action of male element on ovum, in setting up segmentation."

ZACHARIAS, O. Ueber Eier und Samenfäden. Biol. Centralbl. vi, p. 250; Ber. 58 Versamml. Naturf. 1885, p. 100.

In plants and Amphibians, male cells distinguished by small or absent nucleoli and rich content of nuclein; female by poverty of nuclein, abundance of albumen, and one or more nucleoli. The fertilized ovum has thus a larger proportion of nuclein than the unfertilised.

—. Ergebnisse einer zoologischen Excursion. Z. wiss. Zool. xliii, pp. 271-275, 4 figs.

In describing spontaneous transverse division of *Planaria*, notes that when supply of food abundant, a new act of fission is to be observed before daughter bud has attained proportions of parent, but if amount of food reduced or altogether withdrawn, reproduction by division completely ceases.

MAMMALIA.

BY

W. L. SCLATER, B.A., F.Z.S.

I.—INTRODUCTION.

THE history of Mammals during the year 1886 has not been signalized by the appearance of any work containing very remarkable or novel discoveries, but a large number of papers have been written, many of which contain facts and deductions of much value. Perhaps those of most interest, as bearing on the phylogeny of Mammals, are three embryological monographs: PARKER (286), on the development of the skull in the *Insectivora* and *Edentata*, which throws considerable light on the relations and descent of these ancient and decaying forms; SELENKA (342), which has solved many of the disputed points in the development of Marsupials, more especially with regard to the yolk-sac and allantois; and DENIKER (94), which treats of the development of the anthropoid Apes, and gives a careful comparison of the foetus of a Gorilla with a human foetus of the same age. CUNNINGHAM (88) has also contributed to our knowledge of the anthropoid Apes, and in the same paper has dispelled the hitherto prevalent idea that the lumbar curve of the spinal column is peculiar to man, and due to his upright position.

In Mammalian palæontology much work has been done. SCHLOSSER (330) has written an account of the fossil *Ungulata*, and of his views with regard to their origin and descent from early Eocene times. LYDEKKER (216-223) in England, FILHOL (115) in France, COPE (75-83) in North America, and AMEGHINO (17-19) in the Argentine Republic, have described a large number of new fossil types.

Another feature of the year's work is the very large number of papers, and some of considerable importance, that have been written on the subject of the *Cetacea*, both recent and extinct. ALBRECHT (4) considers the Whales to be the most primitive of all Mammals, and the most nearly allied to the ancestors of Mammalian life ("Promammalia"). WEBER (390) writes on the anatomy of Whales, but agrees with the more sober and more generally accepted view of the nearer relations of

the *Cetacea* to the Pinnipeds and to *Zeuglodon*. CAPELLINI (63), PORTIS (299), and PROBST (303), have all described a large number of new species of fossil Whales, and finally, VAN BENEDEN (39), COLLETT (71), and AURIVILLIUS (21), have each written monographic essays upon recent species.

The year 1886 has also been marked by the appearance of a considerable number of new journals, containing papers on Mammals. Among the most important of these for the student are the "Zoologische Jahrbücher," edited by Spengel; the "Anatomischer Anzeiger," which contains papers on comparative as well as on human anatomy, and the "Journal of the Bombay Natural History Society."

The number of new genera of Mammals described in 1886 is 32, as against 25 in 1885. Of these the majority (twenty-seven) are fossil; of the remaining 5, 3 are merely new generic names for types hitherto known, while 2—*Dymecodon* of TRUE (381), a new genus of Moles, and *Eliurus* of MILNE-EDWARDS (242), a new genus of Rodents—are for newly-discovered forms. The number of new species described is 99, as against 113 in 1885, and 103 in 1884. Of these, 23 are recent and 76 are fossil; besides these there have been 9 forms described as subspecies.

II.—LIST OF PUBLICATIONS, WITH SHORT NOTICES.

AITKEN. [See STERNDAL (355).]

1. ALBRECHT, P. Vergleichend-anatomische Untersuchungen. Erster Band, Erstes und Zweites Heft. Hamburg: 1886, 8vo.

Contains (1) Ueber Penis, Penoid und Pseudopenis der Wirbelthiere, nebst einem Nachweise, das die freien Gliedmassen der Amphibien und Amnioten nicht den meta- sondern den meso-pterygischen Abschnitten der paarigen Selachierflossen entsprechen; pp. 1-42 [*cf.* No. 3]. (2) Nachweis, das die primitive und die definitive Saltellehne der Wirbelthiere an einem und demselben, morphologisch zweifellos gekennzeichneten Orte liegen; pp. 43-48 [answer to Rabl-Rückhard (305).] (3) Ueber Chorda und Chordome metamere und continuirliche Verknöcherung in der knorpeligen Nasenscheidewand der Wirbelthiere, nebst einem ersten Versuche, eine wirkliche, unumstössliche Grundlage für die Wirbeltheorie des Schädels zu schaffen; pp. 49-88.

2. —. Ueber den morphologischen Sitz der Hasenschartenkieferspalte. Biol. Centralbl. vi, pp. 79-82 & 121-123.

An answer to Prof. Kölliker (Biol. Centralbl. v, p. 372) as to the identification of the split in a case of hare-lip.

3. —. Ueber die morphologische Bedeutung der Penischisis, Ep- und Hypospadie des Menschen. *T. c.* pp. 204-212. [See also Centralbl. für Chirurgie, 1886, No. 24].

The author asserts the homology of the human penis with the pterygopodia or claspers of the Selachians.

4. [ALBRECHT, P.] Ueber die cetoide Natur der Promammalia. *Anat. Anz.* i, pp. 338-348.

Gives a list of the points in which the *Cetacea* differ from the rest of the *Mammalia*, and hence deduces that they are the most nearly related of all existing Mammals to the hypothetical Promammalia.

5. —. Ueber die Shepherd'schen Frakturen des Astragalus. *Centralbl. für Chirurgie*, 1885, No. 24 Beilage.

On certain points in the serial homology of the tarsus and carpus of Mammals.

6. —. Ueber den morphologischen Werth überzähliger Finger und Zehen. *Op. cit.* 1886, No. 24.

The author distinguishes two forms of hyperdactylism, the true and false; the former being the reappearance of fingers or toes lost, but which have been shown to exist in the phylogenic history, the latter simply a reduplication of a finger or toe already present.

7. —. Zur Diskussion der die Hasenscharten und schrägen Gesichtspalten betreffenden Vorträge der Herren Biondi und Morian. *T. c.* 1886, No. 24 Beilage.

Further contribution to the discussion on the nature of hare-lip.

8. —. Vogelschnabel und Säugethierelippe. *Fortschritte der Medicin*, iv, pp. 358 & 359.

A continuation of a discussion with Prof. His on the subject of hare-lip.

9. —. Die vier Zwischenkiefer, das Quadratum, das Quadratojugale, das Jugale, die Postfrontalia, das Basioticum, die epipituitären Wirbelcentren, der Pro-atlas und das Costoide der Säugethiere. *Extr. des Compt. rend.* 8 sess. Congrès internat. d. Sc. méd. Copenhag. 1884, pp. 1-4.

A recapitulation of former papers.

10. —. "Herr Paul Albrecht zum letzten Male." *SB. Ges. Würtz.* 1886, pp. 84-91.

Answer to Prof. Kölliker on the subject of the notochord in the Cow's mesethmoid, and on the subject of the number of the intermaxillary bones.

11. * —. Sur la place morphologique de l'homme dans la série des mammifères, suivi d'un essai sur la criminalité de l'homme au point de vue de l'anatomie comparée. Hamburg: 1886, 8vo, pp. 1-13, avec 2 gravures.

ALIX. [See CUYER (89).]

12. ALLEN, H. On the Tarsus of Bats. *Am. Nat.* xx, pp. 175-177.

With diagrams of the tarsus in several forms; in *Rhinolophus* alone the calcaneum enters into the ankle joint.

13. [ALLEN, H.] On the Types of Tooth-Structure in *Mammalia*. *T. c.* pp. 295 & 296.

Notes on the arrangement of the cusps of the molars in different Mammals.

14. —. Muscles of the Hind Limbs of *Cheiromeles torquatus*. *Science*, vii, p. 506.

15. —. On a Post-tympanic Ossicle in *Ursus*. *P. Ac. Philad.* 1886, p. 36.

16. ALLEN, H. T. Ruminants of the Copper River Region, Alaska. *Science*, vii, p. 57.

Notes on the Deer (*Alces machlis* and *Rangifer tarandus*) and the Bighorns (*Ovis canadensis dalli*? and *Mazama montana*) found in this region.

17. AMEGHINO, F. *Oracanthus* y *Cœlodon*, géneros distintos de una misma familia. *Bol. Ac. Arg.* viii, pp. 394–398.

Note on the question of the identity of the two genera above-mentioned, asserted by Burmeister, denied by the author. [See *Bol. Ac. Arg.* vii, p. 499.]

18. —. Contribuciones al conocimiento de los Mamíferos fósiles de los terrenos terciarios antiguos del Paraná. *Bol. Ac. Arg.* ix, pp. 3–226.

Descriptions of a very large number of fossil Mammals from the Argentine, the new species belonging to the following genera :—*Epiblema*, *Tetrastylus*, *Plexochaerus*, *Anchimys*, *Stenotephanus*, *Tomodus*, *Nephottherium*, *Comaphorus*, *Proeuphractus*, and *Strata*, which are all new, and to *Canis*, *Megamys*, *Lagostomus*, *Morenia*, *Orthomys*, *Toxodon*, *Haplodontherium*, *Dibolodon*, *Scalabrintherium*, *Promegatherium*, *Pseudolestodon*, and *Chlamydotherium*, which are genera already described. Altogether, 22 new species are described and 11 new genera.

19. —. *Oracanthus* und *Cœlodon*, verschiedene Gattungen einer und derselben Familie. *SB. Ak. Berlin*, 1886, pp. 463–466.

Contests Burmeister's view (*SB. Ak. Berlin*, 1885, p. 567) that these two forms are identical.

20. ANDERSON, R. J. On the so-called Pelvisternum of certain Vertebrates. *P. Z. S.* 1886, pp. 163–165.

21. AURIVILLIUS, C. W. S. Osteologie und äussere Erscheinung des Wals Sowerby's (*Micropteron bidens* [Sow.]). *Bih. Sv. Ak. Handl.* xi, No. 10, pp. 1–40, taf. i & ii.

Description of a specimen of this rare Whale caught on the coast of Sweden.

22. AYRES, W. O. Carnivorous Prairie Dogs.—Carnivorous Oriole. *Science*, viii, p. 105.

23. BACKHOUSE, J. On a Mandible of *Machaerodus* from the Forest-bed ; with an Appendix by R. Lydekker, Esq. Q. J. Geol. Soc. xlii, pp. 309-312, pl. x.

24. BAGINSKY, B. Zur Entwicklung der Gehörschnecke. Arch. mikr. Anat. xxviii, pp. 14-36, taf. v & vi.

On the development and histology of the cochlea.

25. —. Ueber den Ursprung und den centralen Verlauf des Nervus acusticus des Kaninchens. SB. Ak. Berlin, 1886, i, pp. 255-258.

Note on the myelonic origin of the eighth nerve.

26. BALKWILL, F. H. Risso's Grampus (*Grampus griseus*). Rep. Plym. Inst. ix, pp. 314-317, with plate.

27. BALL, V. Observations on Lion-breeding in the Gardens of the Royal Zoological Society of Ireland. Tr. R. Irish Ac. xxviii, pp. 723-758, pl. xviii.

A general account of the Lion-breeding in the Dublin Zool. Gardens, with details as to the number of cubs at a birth, the monthly periods of maximum production (*i.e.*, April and September), the sexes and mortality of the cubs, etc., etc. At the end a series of tables containing the statistics is given.

28. —. On the Collection of the Fossil *Mammalia* of Ireland in the Science and Art Museum, Dublin. Tr. R. Dublin Soc. (2) iii, pp. 333-348, pl. xi.

Contains an account of the collection arranged in three series: 1, Prehistoric Mammals (Wild); 2, Prehistoric Mammals (Domestic); 3, Pleistocene Mammals.

29. BALLOWITZ, E. Zur Lehre von der Struktur der Spermatozoën. Anat. Anz. i, pp. 363-376.

On the spiral thread in spermatozoa, which the author asserts to be double, and on other points in the structure of spermatozoa.

30. BARALDI, G. Apparato Femminile della Generazione nei Nilgau (*Portax picta*, Pall.) ed un cenno sulla loro placenta. Atti Soc. Tosc. (Mem.) viii, pp. 205-214, 1 pl.

On certain peculiarities in the uterus of this Ungulate; the neck of the uterus being divided into two portions, a uterine and a vaginal portion, each surrounded by several sphincters.

- 30A. BARDELEBEN, K. Hand und Fuss. Tagebl. Vers. Deutsch. Nat. lix, pp. 96-102.

On the original heptadactyle condition of the vertebrate hand and foot.

31. BAUR, G. Ueber die Kanäle in Humerus der Amnioten. Morph. JB. xii, pp. 299-305.

The humerus of *Amniota* may contain an entepicondylar or an ectepicondylar canal, or both. A list of animals is given containing the three different modifications.

32. [BAUR, G.] Herrn Professor K. Bardeleben's Bemerkungen über *Centetes madagascariensis*. Zool. Anz. ix, pp. 219 & 220.

Answer to Bardeleben (SB. Jen. Ges. 1885, Sitz. von 30 Oct.) as to the number of species of the genus *Centetes*.

33. —. Ueber die Morphogenie der Wirbelsäule der Amnioten. Biol. Centralbl. vi, pp. 332–342 & 353–363.

On the various views lately promulgated, more especially by Fritsch and Cope; the author agrees with Cope's views.

34. —. Ueber das Quadratum der Säugethiere. SB. Ges. Morph. ii, pp. 45–57.

A review of the recent literature on the subject. The author agrees to a great extent with the views of Albrecht and Dollo: *i.e.*, that the malleus of Mammals is the cartilaginous distal part of the stapes, and is formed from the epimandibular part of Meckel's cartilage; the quadrate is represented in Mammals by the zygomatic process of the squamosal.

35. BEAUREGARD, H. Note sur la Balænoptère de Cavalaire (*Balænoptera musculus*). CR. Soc. Biol. (8) ii, p. 47.

36. —. Note sur une jeune Balænoptère capturée près de Fécamp (*B. rostrata*). T. c. p. 687.

37. —. Note sur une Megaptère échouée au Bruse près Toulon. T. c. p. 753.

38. BEAUREGARD & BOULART. Note sur la placentation des Ruminants. J. de l'Anat. Phys. xxi, pp. 93–99, pl. v.

The placentation of the Ruminants is of three grades: (1) Diffuse, as in *Camelidæ* and *Tragulidæ*; (2) Cotyledonary with many cotyledons, as in *Bovidæ* and *Giraffidæ*; (3) Cotyledonary with few cotyledons, as in the *Cervidæ*.

BEAUREGARD. [See POUCHET (300 & 301).]

39. BENEDEN, P. J. VAN. Histoire naturelle de la Baleine des Basques (*Balæna biscayensis*). Mém. Cour. 8vo, xxxviii, No. 5, pp. 1–44.

A monograph on this species, containing the history, synonymy, description, habits, and mode of capture of this Whale.

40. —. Les Cétacés des mers d'Europe. Bull. Ac. Belg. (3) x, pp. 707–732.

List of Whales found on European coast from Nova Zembla to Gibraltar, including the Black and Mediterranean Seas. 9 Whales and 11 Dolphins are mentioned in the list.

41. —. Sur quelques ossements de Cétacés recueillis au pied du Caucase. Op. cit. xi, pp. 281–283.

Remains of *Cetatherium rathkei* of Brandt sufficiently perfect to allow of a description of the generic characters of *Cetatherium*.

42. BIELZ, E. A. Ueber die in Siebenbürgen vorkommenden Fledermäuse. Verh. siebenb. Ver. xxxvi, pp. 76–84.

The number of Bats found in Siebenbürgen is 17. Following the list is a translation of the descriptions of several new varieties and species

published by Daday in a Slav periodical (Orvos-természettudományi értesítő, x, p. 266); also a description of an entirely new variety by the author himself [*cf. Chiroptera*].

43. BLAAUW, F. E. Reproduction en Hollande des Antilopes Gnous. Bull. Soc. Acclim. (4) iii, pp. 494-496.

44. BLAKE, H. A. Note on the Parturition of a West Indian Bat. P. R. Dubl. Soc. iv, pp. 449 & 450.

Account of the birth of a Bat of a supposed new species.

BLIGH. [See NEVILL (271).]

45. BOLLINGER, —. Ueber Tuberculose beim Affen. SB. Ges. Morph. ii, pp. 5 & 6.

46. BONNET, R. Ueber angebliche Chordaresten in der Nasenscheidewand des Rindes. SB. Ges. Morph. i, pp. 171 & 172.

A refutation of Albrecht's supposed discovery of the notochord and seven vertebrae in the nasal septum of the Cow.

47. —. Ueber die Eihäute der Wiederkäuer. *Op. cit.* ii, pp. 58-73.

On the chorion and on the vessels of the chorion in embryonic Ungulates.

48. BOULART, R. Note sur les poches pharyngiennes des ours. J. de l'Anat. Phys. xxi, pp. 535-537.

49. —. Note sur le système vasculaire des poches laryngiennes de l'orang-outang. C.R. Soc. Biol. (8) iii, pp. 215 & 216.

50. —, & PILLIET, A. Note sur l'organe folié de la langue des mammifères. J. de l'Anat. Phys. xxi, pp. 337-345.

51. — & —. Sur les papilles foliées de quelques mammifères. C.R. Soc. Biol. (8) ii, pp. 143-146.

Description of the foliaceous papillae on the tongues of Mammals from several different orders.

BOULARD. [See BEAUREGARD (38), DENIKER (95), and PILLIET (293).]

52. BROCCHI, P. Traité de Zoologie agricole. Paris: 1886, 8vo, pp. 1-984, avec 603 figs. en texte.

Mammals, pp. 1-95, contains accounts of all French Mammals.

53. BUNGE, A. Bericht über fernere Fahrten in Lena-Delta und die Ausgrabung eines angeblich vollständigen Mammuth-cadavers. Bull. Ac. Pétersb., xxx, pp. 228-282.

Account of the find of a Mammoth in Siberia.

54. BURMEISTER, H. Weitere Bemerkungen über *Cœlodon*. SB. Ak. Berlin, 1886, pp. 357 & 358.

Note on a correction to a paper written the year before [*op. cit.* 1885, p. 567].

55. [BURMEISTER, H.] Nochmalige Berichtigung zu *Celodon*. *T. c.* pp. 1127-1132.

The author still upholds his opinion that the lower jaw described by him is that of *Celodon*.

56. —. Ueber *Galictis vittata*. SB. nat. Fr. 1886, pp. 29-31.

Notes on two varieties of this species.

57. BUTLER, A. W. Observations on the Musk Rat. P. Am. Ass. xxxiv, pp. 324-328.

Note on the habitation and habits of *Fiber zibethicus*.

58. CAMERANO, L. Dell' esistenza della *Talpa europæa*, L., in Sicilia. Boll. Mus. Zool. Anat. Comp. Torino, i, No. 4, pp. 1 & 2.

59. —. Ricerche intorno alle specie italiane del genere *Talpa*, Linn. Mem. Acc. Tor. (2) xxxvii, pp. 427-449, tav. i & ii.

Notes anatomical and osteological on the two forms of *Talpa* found in Europe. The author considers *T. cæca* to be merely a variety of *T. europæa*.

60. —, & LESSONA, M. Compendio della Fauna Italiana. 575 incisioni. Torino: 1885, 8vo, pp. 1-311.

Mammals, pp. 1-28, with short descriptions of the various species found in Italy.

61. CANALIS, P. Sullo sviluppo dei denti nei mammiferi. Anat. Anz. i, pp. 187 & 188.

62. CAPELLINI, G. Sopra resti di un Sirenio fossile (*Metaxytherium lovisati*, Cap.) raccolti a monte Fiocca presso Sassari in Sardegna. Con tav. Mem. Acc. Bologn. (4) vii, pp. 39-53.

63. —. Cetacei e Sireni fossili scoperti in Sardegna. Atti Ac. Rom. (Rendiconti) (4) ii, pp. 79-81.

64. CATON, J. D. Domestication of the Grizzly Bear. Am. Nat. xx, pp. 434-438.

65. CHABRY, L. Sur la longueur des membres des animaux sauteurs. J. de l'Anat. Phys. xxi, pp. 356-358.

On the mathematical and dynamical problems involved in springing animals.

66. CHAPER, —. Rapport sur une mission scientifique dans le territoire d'Assinie (côte occidentale d'Afrique). Arch. Miss. Sci. (3) xii. [Mammals, pp. 15-18.]

67. *CHIARUGI, G. Ricerche sulla struttura dell' ovaia della Lepre (*Lepus timidus*, L.). Con 1 tav. Siena: 1885, 4to, pp. 1-26. [Extr. dagli Atti R. Accad. Fisiocrit.]

68. CLARKE, W. E., ROEBUCK, W. D., & STOREY, W. Upper Nidderdale and its Fauna. Naturalist, 1886, pp. 193-211.

Mammals, pp. 195-197; 30 in number.

CLARKE. [See SOUTHWELL (349).]

69. COCKS, A. H. The Fin-Whale Fishery of 1885 on the North European Coast. Zool. (3) x, pp. 121-136.

70. COESTER, C. Ueber die Fortpflanzung der Wasserspitzmaus und der Hausspitzmaus. Zool. Gart. xxvii, pp. 125 & 126. [Cf. *Sorex*.]

71. COLLETT, R. On the External Characters of Rudolphi's Rorqual (*Balænoptera borealis*). P. Z. S. 1886, pp. 243-265, pls. xxv & xxvi.

General account of the external features, habits, food, and parasites of this Whale. It is captured in considerable quantities by certain companies who have establishments for that purpose on the coast of Finmark. At the end a synopsis of the four northern species of the genus *Balænoptera*.

72. —. On *Phascogale virginia*, a rare Pouched Mouse from Northern Queensland. T. c. pp. 548 & 549, pl. ix.

73. COLUCCI, V. Sulla vera natura glandolare della porzione materna della placenta nella donna e negli animali. Mem. Acc. Bologn. (4) vii, pp. 133-158, tav. i-iii.

A description of the histological structure of the placenta in several Mammals, with general remarks on the nature of the placenta as a whole.

74. CONWENTZ, —. Die einheimische Wirbelthier-Fauna. Schr. Ges. Danz. iv, 3^{tes} Heft, pp. 10-14.

On p. 10 is a list of some of the hibernating Mammals in the neighbourhood of Danzig.

75. COPE, E. D. Corrections of Notes on *Dinocerata*. Am. Nat. xx, p. 155.

Note to the effect that the genus *Tetheopsis* is arti-fact, and has no real existence.

76. —. The *Plagiaulacidae* of the Puerco Epoch. T. c. p. 451.

Description of a new species, *Neoplagiaulax molestus*.

77. —. The Phylogeny of the *Camelidae*. T. c. pp. 611-624.

The number of genera recognized by Cope is 8; of these *Procamelus* is the most ancient, dating from the Loup Fork Beds (Miocene); ancestral to *Procamelus* is *Protolabis*, with a full set of incisor teeth, and ancestral to *Protolabis* is *Pœbrotherium*, with distinct metatarsal bones, as well as a full set of incisors; *Pœbrotherium* occurs in the lowest beds of Miocene (i.e., White River); the author also notices a progressive development of the brain, both in size and development of the convolutions in this family.

78. —. On Lemurine Reversion in Human Dentition. T. c. pp. 941-947.

Shows by means of tables how the superior molar teeth of Man, especially of Europeans and Esquimaux, are reverting from the quadritubercular to the tritubercular type; which constitutes a reversion to the dentition of the Eocene Lemurs of the family *Anaptomorphidae*.

79. [CORE, E. D.] A Giant Armadillo from the Miocene of Kansas. *T. c.* pp. 1044-1046.

Description of a new genus and species of Glyptodont, from Loup Fork Beds of Kansas. This is the first Edentate found north of the valley of Mexico.

80. —. A Contribution to the Vertebrate Palæontology of Brazil. *P. Am. Phil. Soc.* xxiii, pp. 1-22, pl. i. [*Cf. Toxodon.*]

81. —. On Two New Species of Three-Toed Horses from the Upper Miocene, with Notes on the Fauna of the Tricholeptus Beds. *T. c.* pp. 357-361; also *Am. Nat.* xx, pp. 367-369. [*Cf. Anchitherium, Merycochoerus, and Hippotherium.*]

82. —. The Vertebrata of the Swift Current Creek Region of the Cypress Hills. Annual Report of the Geol. and Nat. Hist. Survey of Canada for 1885, i, pp. 79c-85c.

Descriptions of 1 new species [*cf. Menodus*] and of other *Ungulata*.

83. —. Los mamíferos del valle de Mexico ya extinguidos. *An. Mus. Méx.* iii, pp. 325-344.

Contains descriptions of several new fossil Mammals which have already been diagnosed in the *P. Am. Phil. Soc.* xxii, p. 1. There is one new species (*Eschatius longirostris*) described.

84. CORNÉLY, J. M. Élevages au parc de Beaujardin à Tours. *Bull. Soc. Acclim.* (4) iii, pp. 563 & 564.

List of the animals that have been bred in M. Cornély's park, at Tours.

85. CRAGIN, F. W. Notes on some Mammals of Kansas, with a few additions to the list of Species known to inhabit the State. *Bull. Washburn Coll.* i, pp. 42-47.

List of Mammals with notes.

86. CUCCATI, G. Contributo all' anatomia microscopica della retina del Bue e del Cavallo. *Mem. Acc. Bologn.* (4) vii, pp. 201-207, 1 tav.

87. CUMBERLAND, C. The Guinea Pig, or Domestic Cavy, for food, fur, and fancy. London: 1886, 12mo, pp. 1-100.

88. CUNNINGHAM, D. J. The Lumbar Curve in Man and the Apes, with an Account of the Topographical Anatomy of the Chimpanzee and Orang-utan. (Pls. i-xi.) *Cunningham Memoirs of the Royal Irish Academy*; No. II, pp. 1-148. Dublin: 1886, 4to.

Abstract in *Nature*, xxxiii, pp. 378 & 379. The author shows that far too much importance has been attributed to the lumbar curve in Man as a distinction between him and lower animals; the lumbar curve is considerably more marked in the Chimpanzee than in Man. The first 82 pages are devoted to the lumbar column in Man; pp. 83-99 to the lumbar column in the Anthropoids; pp. 100-111 to the lumbar column of the lower Mammalian forms. The second part, pp. 117-148, deals with certain points in the topographical anatomy of the Anthropoid Apes.

89. CUYER, E., & ALIX, E. Le Cheval. Paris : 1886, 4to, pp. 1-703, 16 planches.

Text-book on the horse, its structure, internal and external, and its races and their origin.

90. DAHL, F. Ueber Nahrungsvorräthe im Bau des Maulwurfs. Schr. Nat. Ver. Schleswig, vi, 2^{te} Heft, pp. 111-114.

Notes on the habits of the Mole.

91. DARESTE, —. Note sur les Bœufs fiatos. Bull. Soc. Acclim. (4) iii, pp. 376-381.

Note on a pug-nosed race of horned cattle from Chili.

92. DAVIES, W. Note on the Animal Remains in Bone Caves in North Wales (Ffynnon Benno and Cae Gwyn). Q. J. Geol. Soc. xlii, pp. 17-19.

93. DAWSON, SIR J. W. Handbook of Zoology, with Examples from Canadian Species, recent and fossil. 3rd edition. Montreal : 1886, 12mo, pp. 1-304.

Mammals, pp. 263-273.

94. DENIKER, J. Recherches anatomiques et embryologiques sur les Singes anthropoïdes. 9 planches. Thèses présentées à la faculté des sciences de Paris. Paris : 1886, 8vo, pp. 1-260.

This thesis, also published in Arch. Z. expér. (2) iibis (see also Nature, xxxv, p. 509), contains the results of the examination of foetus of a Gorilla and of a Gibbon (*Hylobates* sp.). The author describes first of all the external characters of the foetus, as compared with one another and with that of Man ; then the skeleton ; then the muscles ; then the nervous system ; and, finally, the other organs. In the final conclusion he reaffirms Huxley's proposition that Man differs less from the Anthropoid Apes than do these from the lower members of the same order. He also points out that the differences in structure between the Gorilla and Man are earlier assumed than was before supposed.

95. DENIKER & BOULART. Note sur les sacs laryngiens des Singes anthropoïdes. J. de l'Anat. Phys. xxii, pp. 51-62, pls. iii & iv.

Anatomical description of the laryngeal pouches in the three anthropoid Apes.

96. DENT, H. C. A Year in Brazil. London : 1886, 8vo, pp. 1-444, with 10 illustrations.

On pp. 345-358 are notes on some Brazilian Mammals.

97. DEPÉRET, C. Sur l'importance et la durée de la période pliocène, d'après l'étude du bassin du Roussillon ; nouveaux documents pour la faune de Mammifères pliocène de ce bassin. C.R. ciii, pp. 1208-1210.

Note on *Lagomys*, *Ursus etruscus*, and *Semnopithecus* found in the Pliocene sands of Perpignan.

98. DEFÉRET, C., & RÉVOLLE, L. Note sur la géologie et sur les Mammifères fossiles du bassin lacustre miocène supérieur de la Cerdagne. Bull. Soc. géol. (3) xiii, pp. 488-506, pls. xvii & xviii.

Descriptions of Mammals, pp. 497-506, i.e., *Sus major*, *Hipparion gracile*, *Castor jaegeri*, *Amphicyon major* var. *pyrenaicus*, n. var., *Mastodon* sp. and *Ictitherium* sp.

99. DOBSON, G. E. Note on the Mandibular Dentition of the Shrews. J. Anat. Phys. xx, pp. 359 & 360.

100. —. Description of a New Species of *Vesperugo* from North America. Ann. N. H. (5) xviii, pp. 124 & 125.

101. —. Article Shrew. Encycl. Brit. xxi, pp. 843 & 844.

General account of family *Soricidae*.

102. DOGIEL, J. Neue Untersuchungen über den pupillenerweiternden Muskel der Säugethiere und Vögel. Arch. mikr. Anat. xxvii, pp. 403-409, taf. xviii.

On the nerve supply of the iris muscle.

DORIA [MARQUIS] G. [See THOMAS, O. (372A).]

103. DOSTOIEWSKY, A. Ueber den Bau der Vorderlappen des Hirnanges. Arch. mikr. Anat. xxvi, pp. 592-598, taf. xxviii.

On the histological structure of the pituitary body.

104. —. Ein Beitrag zur mikroskopischen Anatomie der Nebennieren bei Säugethiern. Op. cit. xxvii, pp. 272-296, taf. xiii.

On the histology of the supra-renal body.

105. —. Ueber den Bau des Corpus ciliare und der Iris von Säugethiern. Op. cit. xxviii, pp. 91-120, taf. x & xi.

Certain points in the morphology of the iris are established in this paper.

106. DUBOIS, E. Zur Morphologie des Larynx. Anat. Anz. i, pp. 178-186 & 225-231, mit 12 Abbild.

Description of the skeleton, muscles, and nerves in the larynx of various Mammals, more especially of *Ornithorhynchus*.

107. EISMANN, G. Der Chimpanse, *Troglodytes niger*, in Gefangenschaft in Afrika. Zool. Gart. xxvii, pp. 24-26.

108. ELLIOTT, H. W. An Arctic Province: Alaska and the Seal Islands. London: 1886, 8vo, pp. 1-474.

Contains accounts of many of the interesting Mammals of Alaska and the Northern Pacific, i.e., *Rhytina*, p. 4; Sea Otter, *Enhydra*, p. 127; *Callorhinus*, and the other Seals, p. 254.

109. ERNST, A. Ein zweites Beispiel eines pathologischen Paka-Schädels. Zool. JB. ii, pp. 189-192.

110. FARINI, G. A. Through the Kalahari Desert. London: 1886, 8vo, pp. 1-475, with 46 illustrations.

Scattered through the book are shooting notes on various Mammals, On pp. 461-467 is a list of Kalahari Mammals, with notes on each.

111. FÉRÉ, C. Deuxième note sur la topographie cranio-cérébrale chez les Singes. *J. de l'Anat. Phys.* xxi, pp. 298-303.

On the brain convolutions of several species of American and African Monkeys, *i.e.*, *Lagothrix*, *Ateles*, *Cebus*, *Brachyurus*, *Cynocephalus*, and *Gorilla*.

112. FERRARI-PEREZ, F. Catalogue of Animals collected by the Geographical and Exploring Commission of the Republic of Mexico. *P. U. S. Nat. Mus.* 1886, pp. 125-199.

List of Mammals (18 in number) on pp. 127-130.

113. FICALBI, E. Ossa accessorie comparativamente studiate nel cranio dell' uomo e dei rimanenti mammiferi. *Atti Soc. Tosc. Mem.* vii, pp. 101-133, tav. x.

On the presence or absence of interparietal and parieto-frontal bones in the *Mammalia*, especially in Man.

114. —. Breve cenno preventivo sulla ossificazione delle capsule periotiche nei mammiferi. *Atti Soc. Tosc. Proc. Verb.* v, pp. 86-90.

115. FILHOL, H. Descriptions de quelques mammifères fossiles des phosphorites du Quercy. Toulouse: 1884, 4to, pp. 1-43, pls. i-xiii. [Extr. de *Ann. Soc. Sci. Phys. Nat. Toulouse*.]

Descriptions of new Mammals—*Cayluxotherium elegans*, *Neurogymnurus cayluxi* and *minor*, *Comphotherium elegans*, *Protalpa cadurcensis*, and *Amphisorex primævus*, all Insectivores; *Plesispermophilus angustidens*, a Rodent; *Hyracotherium quercyi*, *Adrotherium depressum*, *Plesiodacrytherium elegans*, *Oxacron minimus*, *Spaniotherium speciosum*, *Xiphodon magnum*, all Ungulates. Also accounts of other fossil Mammals found in the Quercy beds. [The writer wishes here to thank Mr. Lydekker for the loan of this paper, which does not appear to have reached any of the libraries of this country.] Of several of the Mammals short descriptions were published in the *Bull. Soc. Philom.* (7) viii, p. 62. [Cf. *Zool. Rec.* xxi, *Mamm.* Nos. 108, 109, & 110.]

116. —. Observations relatives à la dentition inférieure des *Tapirulus*. *Bull. Soc. Philom.* (7) x, pp. 5 & 6.

117. —. La formule dentaire supérieure des *Bachitherium*. *T. c.* pp. 81 & 82.

A new discovery of more material in the Quercy phosphorite beds (Upper Eocene) enables the author to show that *Bachitherium* is a genuine Ruminant with no upper incisors.

118. —. Les caractères zoologiques de la faune des Vertébrés fossiles d'Issel. *T. c.* pp. 86-88.

Description of *Lophiodon*, of which an almost complete skeleton has been obtained.

119. FINSCH, O. On a New Species of Wild Pig from New Guinea. *P. Z. S.* 1886, pp. 217 & 218.

120. FISCHER, F., & PEIZELN, A. VON. Vögel und Säugethiere von Jan Mayen. Österr. Polarstat. Jan Mayen, Beob.-Ergebn. iii, Zool. pp. 109-132, 1 taf. [Separatausd. pp. 1-23.]

Mammals, pp. 20-23, with accounts of *Vulpes lagopus* and 3 Seals, *Cystophora cristata*, *Phoca barbata*, and *P. groenlandica*.

121. FISCHER-SIGWART, H. Fossile Knochenfunde aus den interglazialen Kiesschichten in Zofingen und im untern Wiggerthale. MT. Aargau Nat. Ges. iv, pp. 1-5.

On the remains of certain Ungulates in Wiggerthal.

122. FLEMMING, W. Die ektoblastische Anlage des Urogenitalsystems beim Kaninchen. Arch. Anat. Phys. 1886, pp. 236-248, taf. xi.

The author again attempts to prove the derivation of the nephridial epithelium from the epiblastic layer of the embryo.

123. FLOT, —. Note sur l'*Halitherium schinzi*. Bull. Soc. géol. (3) xiii, pp. 439 & 440.

Note on its rudimentary hind-limb.

124. FLOWER, W. H. On a Rare Species of Armadillo. P. Z. S. 1886, pp. 419 & 420.

The animal is closely allied to *Tatusia novemcincta*, but differs from it in having a thick coat of hair. It is identical with *Cryptophractus pilosus* of Fitzinger and *Praopus hirsutus* of Burmeister.

125. —. Article Rhinoceros. Encycl. Brit. xx, pp. 521-523.

Prof. Flower recognizes only 5 species of Rhinoceros, *R. unicornis*, *sondaicus*, *sumatrensis*, *bicornis*, and *simus*.

126. —. Article Seal. Encycl. Brit. xxi, pp. 580 & 581.

Some account of the subfamily of *Phocinæ*.

127. FREEMAN, R. A. The Anatomy of the Shoulder and Upper Arm of the Mole (*Talpa europæa*). J. Anat. Phys. xx, pp. 201-219, pl. v.

Notes chiefly on osteology and myology.

128. FRITSCH, H. VON. Das Pliocän im Thalgebiete der zahmen Gera in Thüringen. JB. Preuss. geol. Landes-Anstalt, 1884, pp. 389-437, taf. xxiii-xxvi.

Mammals, pp. 399-323. Descriptions of *Mastodon arvernensis*, *Cervus* sp., and *Bos* sp.

129. FRORIEP, A. Zur Entwicklungsgeschichte der Wirbelsäule, insbesondere des Atlas und Epistropheus und der Occipital region. II. Beobachtung an Säugethierembryonen. Arch. Anat. Phys. 1886, pp. 69-150, taf. i-iii.

An account of the development of the axial skeleton in Mammals, and a comparison of the details with those of Birds; the most striking discovery is that of well-defined vertebræ in the occipital region of the skull.

130. GAUDRY, A. Note sur les Hyènes de la grotte de Gargas, découvertes par M. Felix Regnault. Bull. hebdom. Ass. sci. Fr. (2) ix, pp. 341-344.

Description of skeleton of the Cave Hyena, which agrees in almost every respect with the recent South African species, *Hyæna crocuta*.

131. GEGENBAUR, C. Zur Kenntniss der Mammarorgane der Monotremen, mit einer Tafel und zwei fig. in text. Leipzig: 1886, 4to, pp. 1-39.

Shows that in Monotremes the mammary glands are in their simplest and earliest state, that the region of the mammary glands is only distinguished from the rest of the abdomen by its thicker musculature, and that the mammary glands are closely connected with the hair follicles, but belong to the sudoriparous, and not to the sebaceous, type as in other Mammals.

132. —. Beiträge zur Morphologie der Zunge. Morph. JB. xi, pp. 566-606, taf. xxx & xxxi.

Note on the structure of the tongue and "sublingua" (Unterzunge) in the Lemurs and other Mammals.

133. GÖLDI, E. A. Ein pathologischer Paca-Schädel. Zool. JB. i, pp. 213-215.

Description of a skull of *Cælogenys paca*, in which the left upper incisor had grown round and up right through the plate springing from the zygomatic arch.

134. —. Bericht über zwei ältere, unbekannt gebliebene illustrierte Manuscripte portugiesisch-brasilianischer Naturforscher. Op. cit. ii, pp. 175-184.

Contains an account of two MSS. works on the Brazilian fauna. The first, by Alex. Rod. Ferreira, contains forty-five plates, illustrating the Mammals of Brazil; the second, by Arruda da Carrara, contains nine plates. The dates of the MSS. are the end of last century and the beginning of this respectively.

135. GOTTSCHAU, —. Zur Entwicklung der Säugetierlinse. Anat. Anz. i, pp. 381 & 382.

136. GRAY, D. Voyage of the 'Eclipse' to Greenland Seas. Zool. (3) x, pp. 50-54.

Notes on various Whales and Seals met with.

137. GREGORIO [MARCHESE] A. DE. Intorno a un deposito di Roditori e di Carnivori sulla vetta di Monte Pellegrino, con uno schizzo sinchronografico del calcare postpliocenico della vallata di Palermo. Atti Soc. Tosc. viii, pp. 217-248, tav. v-viii.

Descriptions of new fossil Mammals, i.e., *Pellegrina panormensis* (rodent), *Mustela argilla*, *Mus piletus*.

138. GREVÉ, C. Zur Naturgeschichte des Wolfes. Zool. Gart. xxvii, pp. 133-138.

139. *GRUBER, W. Monographie über der Musculus extensor digiti indicis proprius und seine Varietäten bei dem Menschen und bei den Säugethieren, in Gruber's Beobacht. aus d. Menschl. u. vergl. Anat., 6 Heft, pp. 1-69, taf. i.

140. GUILLEMAND, F. H. H. The Cruise of the 'Marchesa' to Kamchatka and New Guinea. London: 1886, 8vo, 2 vols.

Notes on various Mammals seen and collected during the voyage; among others—Sable, i, p. 119; Fur Seal, i, p. 201; Bighorn (*Ovis nivicola*) i, p. 214; *Tarsius spectrum*, ii, p. 184; *Babirusa*, ii, p. 204; *Anoa*, ii, p. 211; and *Proechidna bruijii*, ii, p. 317.

141. GULDBERG, G. A. Om subfossile og forhistoriske Knokkelfund af pattedyr i Norge. N. Mag. Naturv. xxx, pp. 76-80.

Notes on some Whale remains, belonging apparently to several different species.

142. —. Zur Biologie der nordatlantischen Finwalarten. Zool. JB. ii, pp. 127-174.

Contains details on the breeding of Whales: one young one alone is produced at a birth; the new-born Whale is about one-third to one-fourth the length of its mother; the young animal is at birth well developed, and able to take care of itself. For the species worked at, see *Cetacea*.

143. GÜNTHER, A. Second Note on the Melanotic Variety of the South African Leopard. P. Z. S. 1886, pp. 203-205.

Contains a letter from Mr. Abraham, of Graham's Town, S.A., describing a melanotic Leopard's skin, and enclosing a photograph, which is reproduced (p. 204).

144. HAACKE, W. Ueber den Brutbeutel der *Echidna*. Zool. Anz. ix, p. 471.

The author confirms his previous statement that the young *Echidna*, after being hatched, remains for a considerable period in the pouch of the mother.

145. —. Der Nordpol als Schöpfungszentrum der Landfauna. Biol. Centralbl. vi, pp. 363-370.

The author adduces as proof of his thesis, the retreat of all the older forms of life to the southern ends of the great continents, *i.e.*, South America, Australia, and Madagascar.

146. *HALPERINE, E. De l'origine des Mammifères. Morlaix: 1886, 8vo, pp. 1-4.

147. HARTING, J. E. Beavers and their Ways. Zool. (3) x, pp. 265-286.

Notes on the history of Beavers, and on their habits and distribution.

148. —. On the Former Occurrence of the Wild Boar in Buckinghamshire. T. c. pp. 345-354

The former existence of the Wild Boar at Chetwode is proved by the survival of a curious tax, or toll, known as the Rhyne Toll. This was granted to an ancient Lord of the Manor of Chetwode for slaying a Wild Boar which had devastated the neighbourhood.

149. HARTLAUB, C. Beiträge zur Kenntniss der *Manatus*-Arten. Zool. JB. i, pp. 1-112, taf. i-iv.

The author distinguishes 3 species of the genus [*cf. Manatus*], and very carefully compares the skulls of the three forms. Notes on the distribution of the group are added. Natterer's species, the hitherto less generally recognized form (*M. inunguis*), is fluviatile, and confined, as far as is known, to the Amazons and Orinoco.

150. —. Ueber *Manotherium delheidi*, eine Sirene aus dem Oligocän Belgiens. T. c. pp. 369-378.

151. HASSE, C. Ueber die Gefässe in der lamina spiralis membranacea des Gehörorgans der Wirbeltiere. Anat. Anz. i, pp. 96-98.

152. HASWELL, W. A. On the Myology of the Flying Phalanger (*Petaurista taguanoides*). P. Linn. Soc. N.S.W. (2) i, pp. 176-182.

The only remarkable modification of the muscles of this flying form is the presence of a femoro-caudal muscle not found in any other Mammal.

153. HEAPE, W. The Development of the Mole (*Talpa europæa*): the Ovarian Ovum and the Segmentation of the Ovum. Q. J. Micr. Sci. xxvi, pp. 157-174, pl. xi.

An account of the early stages of the Mole to the end of the segmentation process.

154. —. The Development of the Mole (*Talpa europæa*): stages E to J. *Op. cit.* xxvii, pp. 123-163, pls. xi-xiii.

Detailed account of the early formation of the principal organs of the body from the three primitive cell-layers.

155. HERTWIG, O. Lehrbuch der Entwicklungsgeschichte des Menschen und der Wirbelthiere. Erste Abt. mit 129 Abbildungen und zwei Tafeln. Jena: 1886, 8vo, pp. 1-202.

A new text-book of embryology; the present part contains a description and history of the generative products, a general description of segmentation and the formation of the layers, metameric segmentation, and of the egg-membranes of Sauropsida and Mammals.

156. HOFMAN, A. Säugethierreste aus der Stuhleck-Höhle. MT. Ver. Steierm. xxi, pp. 3-11, taf. i & ii.

Descriptions of fossil remains—*Ursus*, *Lepus*, *Antilope*.

157. HOLDER, C. F. The Ivory King: a Popular History of the Elephant and its Allies. London: 1886, 8vo, pp. 1-330, illustrated.

158. HOLMBERG, E. L. Los resultados científicos, especialmente zoológicos y botánicos, de los tres viajes llevados á cabo, en 1881, 1882 y 1883, á la Sierra del Tandil. Act. Ac. Cordob. v. [Mamíferos, pp. 63-72.]

List of Mammals (13 in number) obtained in the Sierra del Tandil, in the southern part of the province of Buenos Ayres.

159. HORNADAY, W. T. Two Years in the Jungle; the Experiences of a Hunter and Naturalist in India, Ceylon, the Malay Peninsula, and Borneo. London: 1885, 8vo, pp. 1-512.

Accounts of Mammals met with: *i.e.*, Deer, p. 69; Elephant, p. 130; Tiger, p. 152; Orang, p. 398; and of shooting expeditions.

160. HUET, L. Liste des espèces connues et décrites dans la famille des Antilopidés présentées par régions. Bull. Soc. Acclim. (4) iii, pp. 465-493.

The first part. The Antelopes are described according to their regions: Palæarctic 4, Himalayan and Japanese 10, Southern Asia 7, Celebes and Sumatran 3, Arabian 3, and South African 3. The species dealt with are 30 in number, distributed in the following genera: *Capra* 2, *Antilope* 14, *Procapra* 1, *Nemorhedus* 5, *Tetraceros* 1, *Gazella* 5, *Anoa* 1, and *Capricornis* 1.

161. —. Note sur la dimension des éléments anatomiques des Mammifères. Bull. Soc. L. Norm. (3) ix, pp. 122-126.

On the actual size of the primitive bundles of the muscles in various Mammals; the size of the bundles varies with the size of the animals, but not proportionally.

162. IHERING, H. v. Ueber die Haus-ratten Brasiliens. SB. nat. Fr. 1886, pp. 102-107.

- 162A. —. Ueber "Generationswechsel" bei Säugethieren. Biol. Centralbl. vi, pp. 532-537.

Contains some observations on the early stages of the armadillo *Praopus*. It appears that there are always 8 young found in the uterus, that they are all of the same sex, and of approximately the same age; and, further, that they are all developed from one primitive ovum. The author believes that the polar bodies of other forms represent the degenerate blastoderms that should form the full compliment of embryos, as is the case in *Praopus*.

163. JAMES, J. F. Catalogue of the Mammals, Birds, Reptiles, Batrachians and Fishes in the Collection of the Cincinnati Society of Natural History. J. Cincinn. Soc. ix. [Mammals, pp. 47-52].

164. JEGOROW, J. Das ganglion ophthalmicum. Tryd. Kazan. xvi, No. 3, pp. 1-136, pls. i-v (Russian).

165. JENSEN, O. S. Ueber die Struktur der Samenkörper bei Säugethieren, Vögeln und Amphibien. Anat. Anz. i, pp. 251-257.

On the spiral-thread asserted to be present on the *Spermatozoa* examined by the author (*i.e.*, Mouse, Sheep, and Man).

166. JENTINK, F. A. On Two New Species of *Cercopithecus*. Notes Leyd. Mus. viii, pp. 55-57.

167. —. On *Paradoxurus annulatus*, Wagner. T. c. pp. 127-129, pls. iv & v.

For this form, which Jentink identifies with *Bassaris sumichrasti*, de Saussure, *B. variabilis*, Peters, *B. monticola*, Cordero, and *B. raptor*,

Alston, he proposes the new generic term *Wagneria*. The locality seems still uncertain.

168. [JENTINK, F. A.] On a New Species of *Hyrax* (*Hyrax stampflii*) from Liberia. *T. c.* pp. 209-212.

169. JESSOP, W. H. On the Anatomy, Histology, and Physiology of the Intra ocular Muscles of Mammals. [Abstract.] *P. R. Soc.* xl, pp. 478-484.

Describes the anatomy and histology of the internal eye-muscles in Mammals; also the action of cocaine, atropine, &c., on the eye.

170. JOHNSTON, H. H. The Kilima-njaro Expedition. London: 1886, 8vo.

Colobus kirkii, p. 39; Zebras, p. 67; Antelopes, pp. 69, 219, 224, 355, &c. Chapter xviii contains an account of the zoology of Kilima-njaro.

171. JOUAN, H. Note sur quelques Cétacés capturés ou échoués sur les côtes de l'Europe de 1879 à 1885. *Mém. Soc. Cherb.* xxiv, pp. 305-312.

Notes on the external appearance of specimens of *Hyperoodon rostratus*, *Balenoptera musculus*, and *Orca gladiator*, stranded on the coast of France at different times.

172. KEHRER, G. Beiträge zur Kenntniss des Carpus und Tarsus der Amphibien, Reptilien, und Säugerthiere. *Ber. nat. Ges. Freiburg*, i, pp. 73-86, taf. iv.

The author derives the pentadactyle hand from an original heptadactyle form.

173. KEIBEL, F. Zur Entwickelung des Glaskörpers. *Arch. Anat. Phys.* 1886, pp. 358-368, taf. viii.

On the development of the Mammalian vitreous humour. The author shows that the vitreous humour is formed solely by means of the blood-vessels passing through the choroidal fissure.

174. KELLER, F. C. Die Gemse: ein monografischer Beitrag zur Jagdzoologie. Klagenfurt: 1887 (pub. 1885), 8vo, pp. 1-515.

On the natural history of the Chamois.

175. KERVILLE, H. G. DE. Note sur un Orque épaulard péché aux environs du Tréport. *Bull. Soc. Rouen*, xx, pp. 105-109.

Notes and measurements of a species of *Orca gladiator*.

176. KINKELIN, F. Ueber sehr junge Unterkiefer von *Elephas primigenius* und *Elephas africanus*. *Ber. senck. Ges.* 1886, pp. 145-160.

On the differences in the lower jaws of these two forms.

177. KOBELT, W. Die Säugetiere Nordafrikas. *Zool. Gart.* xvii, pp. 169-177, 205-212, 237-243, & 312-316.

The author gives a list of the Mammals of North Africa, 92 in number, and comes to the conclusion that the intimate relations between the North African and Southern European faunas are exaggerated; but that, nevertheless, North Africa must be considered an outlying sub-region of the Palearctic Region. The rest of the paper consists of notes on various animals found in North Africa.

178. KOHL, F. F. Ueber neue und seltene Antilopen. Ann. k. k. Nat. Hofmus. i, pp. 75-86, pls. iii-vi.

Description of a collection of Ungulate Mammals from Somali-land of the genera *Gazella*, *Tragelaphus*, and *Asinus*; a new species of Gazelle is described. A new genus, *Lithocranius*, is made for *Gazella walleri*, Brooke.

179. —. Ueber *Gazella pelzelni*, n. sp. Verh. z. b. Wien, xxxvi, p. 4.
— [See PELZELN (291).]

180. KORÁNYI, A. Beiträge zur Entwicklung der Krystalllinse bei den Wirbeltieren. Intern. J. Anat. Hist. iii, pp. 226-238.

181. KRAUSS, —. Varietät einer Fischotter (*Lutra vulgaris*, Erxl., var. *albamaculata*). JH. Ver. Württ. xlii, pp. 344 & 345.

182. KRÜDENER, A. VON. Anomalien beim Elchwilde. Zool. Gart. xxvii, pp. 150-154.

183. *LACHI, P. Degli elementi costituenti il disco prolifero nell'ovaia della vitella. Firenze: 1886, 8vo, pp. 1-8.

184. LANDOIS, H. Die westfälischen fossilen und lebenden Dachse. Zool. Gart. xvii, pp. 281-283.

The fossil Badger differed from the recent form mainly in the size of the auditory organ.

185. —. Ueber einen Hasen mit abnormer Zahnbildung. Ber. Westfäl. Prov. Ver. xiii, pp. 29 & 30.

186. LANGKAU, B. Die Verbreitung der Luchse. Zool. JB. i, pp. 703-722.

On the distribution of the Lynxes in recent and later geological times.

187. —. Tigerpferde. *Op. cit.* ii, pp. 117-120.

On the different forms and distribution of the Zebra.

188. —. Die gestreifte Hyäne, *Hycena striata*, in Asien. Zool. Gart. xxvii, pp. 49 & 50.

Notes on its distribution.

189. —. Der nordwestafrikanische Bär. *T. c.* pp. 83-87.

190. —. Ziegen Afrikas. *T. c.* pp. 114-121.

On the domestic races and species of African Goats.

191. —. Der Sumatra - Elefant, *Elephas sumatranus*. *T. c.* pp. 350-353.

Note on the recent and fossil distribution of the Elephant in the East Indian Archipelago.

192. LATASSE, F. Trois questions. Bull. Sci. Nord, 1884-1885, pp. 364-371.

On the origin of domestic animals, more particularly the Hutch Rabbit, the House Rat, the Mouse, and the Guinea Pig.

193. [LATASTE, F.] Sur le système dentaire du genre *Daman*. Estratto dagli Ann. Mus. Genov. (2) iv, pp. 5-40.

After the establishment of 3 sub-genera to the genus *Procavia* (= *Hyrax*)—these are *Procavia*, *Heterohyrax*, and *Dendrohyrax*—he discusses the teeth of *Hyrax*, and corrects the dental formula from $i. \frac{1}{2} c. \frac{0}{0} m. \frac{6-8}{6-8}$ to $i. \frac{1}{2} c. \frac{1}{0} m. \frac{7}{7}$, thus showing the existence of canines hitherto unsuspected, and still further confirming the relationship of *Hyrax* to the *Ungulata*.

194. —. De l'existence de dents canines à la machoire supérieure des damans ; formule dentaire de ces petits pachyderms. C.R. Soc. Biol. (8) iii, pp. 394-396.

195. LAULANIE, L. La cellule placentaire de quelques rongeurs. C.R. Soc. Biol. (8) ii, pp. 130-132.

196. —. Sur les procédés de la régression des follicules ovariens chez quelques femelles de mammifères. T. c. pp. 644-647.

197. —. Sur le processus vaso-formatif qui préside à l'édification de la zone fonctionnelle du placenta maternel dans le Cobaye. Op. cit. iii, pp. 506-509.

A continuation of the previous argument (No. 195) that the functional part of the placenta is a syncytium with blood spaces within it.

198. —. Sur les connexions embryogéniques des cordons médullaires de l'ovaire avec les tubes du corps de Wolff et leur homologie avec les tubes séminifères (Mammifères). T. c. pp. 132-135.

Shows that the parovarium has nothing to do with the seminal tubules, as has been supposed, but that the latter are homologous to the egg tubes (cordon médullaires).

199. —. Sur la nature de la néoformation placentaire et sur l'unité du placenta. Bull. Soc. Toulouse, xix, pp. 23-30.

200. LAVOCAT, —. Rachis des Vertébrés. Mém. Ac. Toulouse (8) vii, pp. 23-54.

201. LEBOUcq, H. Sur la morphologie du carpe et du tarse. Anat. Anz. i, pp. 17-21.

The Mammalian carpus and tarsus is, according to the author, derived from a heptadactyle type.

202. LECHE, W. Ueber einige südbrasilianische *Hesperomys*-Arten. Zool. JB. i, pp. 687-702, taf. xvi.

Results of the examination of a large number of specimens sent to the author by Dr. v. Ihering from Brazil. Several new varieties are described. [Cf. *Hesperomys*.]

203. LEE, W. S. How the Musk Rat (*Fiber zibethicus*) opens the *Unio*. J. Trenton Soc. N. H. i, p. 8.

204. LEIDY, J. Mastodon and Llama from Florida. P. Ac. Philad. 1886, p. 11.

Description of 1 new species of *Mastodon* and 3 of *Auchenia* from Florida.

205. [LEIDY, J.] An Extinct Boar from Florida. *T. c.* pp. 37 & 38.

Description of a new genus and species of *Suide*, *Euryodon*.

206. —. *Toxodon* and other Remains from Nicaragua, Central America. *T. c.* pp. 275-277.

Note on a new fossil species of *Capybara* [*cf. Hydrochærus*]; also a *Toxodon* from Nicaragua, the most northerly point at which it has yet been procured.

207. *LEISERING, A. G. T. Atlas der Anatomie des Pferdes und der übrigen Hausthiere, 2^{te} Auf. Leipzig: 1885, 4to.

208. LENDENFELD, R. VON. Zur Brutpflege von *Echidna*. *Zool. Anz.* ix, pp. 9 & 10.

Note on the temperature of the brood-pouch of *Echidna*, which is several degrees higher than that of the animal itself.

LESSONA. [See CAMERANO (60).]

209. LEYDIG, F. Die Meerkuh im Rhein bei Bonn. *Verh. Ver. Rheinl.* xliii, pp. 60-66.

Account of the occurrence of *Phocæna orca* in the Rhine two hundred years ago.

210. LILIENBERG, J. Beiträge zur Histologie und Histogenese des Knochengewebes. *Mém. Ac. Pétersb.* (7) xxxiii, No. 2, pp. 1-11, pl. i.

211. LOCKWOOD, S. The Ancestry of *Nasua*. *Am. Nat.* xx, pp. 321-325.

The author asserts the relation of *Nasua* to the *Quadrumana*.

212. LOTHINGER, S. Untersuchungen an der Hypophyse einiger Säugethiere und des Menschen. *Arch. mikr. Anat.* xxviii, pp. 257-290, taf. xix & xx.

The histology of the hypophysis is described in the Dog, Cat, Horse, Pig, Rabbit, and Man. The author concludes with remarks on its physiological function, which he thinks must be of some importance, and is doubtless connected with the "chromophilous" cells.

213. *—. Ueber die Hypophyse des Hundes. Berne: 1886, 8vo, pp. 1-16.

214. LÖWIS, O. VON. Nochmals mein Nörz. *Zool. Gart.* xvii, pp. 316-319.

LUCAS. [See TRUE (385).]

215. LÜTKEN, C. Antikritiske Bemaerkninger i Anledning af Kaempe-Dovendyr-Slaegten *Cælodon*. *Overs. Dan. Selsk.* 1886, pp. 78-84 & xv-xx.

A criticism on Burmeister (*SB. Ac. Berlin*, xxviii, p. 563), who identifies a certain fossil lower jaw found by him in the Argentine with *Cælodon* of Reinhardt, and accuses the latter of several gross errors; Lütken defends Reinhardt.

216. LYDEKKER, R. Catalogue of the Fossil *Mammalia* in the British Museum (Natural History). Part III, containing the Order *Ungulata*, Suborders *Perissodactyla*, *Toxodontia*, *Condylarthra*, and *Amblypoda*. London: 1886, 8vo, pp. 1-183, 30 woodcuts.

Of the 82 species catalogued, 4 only persist to this day, namely, *Tapirus americanus*, *Equus caballus*, *Rhinoceros sondaicus* and *R. unicornis*; the latter genus alone has persisted on from the Eocene Period.

217. —. Catalogue of the Remains of Siwalik *Vertebrata* contained in the Geological Department of the Indian Museum, Calcutta. Part I, *Mammalia*. Calcutta: 1885, 8vo, pp. 1-116.

The collection of which this is a catalogue is a very large and perfect one, and contains a large number of types; it is to be used in connection with the 10th series of the Pal. Ind. 115 species are catalogued.

218. —. Catalogue of the Remains of Pleistocene and Prehistoric *Vertebrata* contained in the Geological Department of the Indian Museum, Calcutta. [Mammals, pp. 1-15.] Calcutta: 1886, 8vo.

These collections are chiefly from the Pleistocene beds of the Narbada, Jumna, Pengangra, and Kistna valleys; 19 species are enumerated.

219. —. Description of Three Species of *Scelidotherium*. P. Z. S. 1886, pp. 491-498, pls. xlii-xliii.

220. —. Description of the Cranium of a New Species of *Erinaceus* from the Upper Miocene of Oeningen. Q. J. Geol. Soc. xlii, pp. 23-25, pl. ii.

221. —. On the Fossil *Mammalia* of Maragha, in North-Western Persia. T. c. pp. 173-176.

A discussion of the relation of these fossils and beds to those of Europe and India.

222. —. Note on some *Vertebrata* from the Red Crag. T. c. pp. 364-368.

223. —. Indian Tertiary and Post-Tertiary *Vertebrata*. Pal. Ind. (10) iv. Part I. Siwalik *Mammalia*, Supplement i, with Addendum, pp. 1-21, pls. i-iv. Part II. The Fauna of the Karnul Caves, pp. 23-58, pls. vii-ix.

Part I contains descriptions of two new Mammals [see *Cynocephalus* and *Tetraceros*], with additional descriptions of several Siwalik Mammals from fresh materials. Part II contains a list of the remains of 40 Mammals collected from the Karnul Caves, in the neighbourhood of Madras.

LYDEKKER. [See BACKHOUSE (23).]

224. MACCORMICK, A. The Myology of the Limbs of *Dasyurus viverrinus*. Pt. I. J. Anat. Phys. xxi, pp. 102-137, pl. iii.

225. MACKAY, J. Y. The Arteries of the Head and Neck and the rete mirabile of the Porpoise (*Phocæna communis*). P. Phil. Soc. Glasg. xvii, pp. 366-376, pl. ix.

226. MACLEAY, W. Zoology of Australia. P. R. Soc. Tasm. 1885, pp. 285-308.

A general account of the Mammalian fauna on pp. 285-288.

227. MACPHERSON, H. A. The Habits of the Greater Horse-shoe Bat. Naturalist, 1886, pp. 337-339.

228. MATTHIESSEN, L. Ueber den physikalisch-optischen Bau des Auges der Cetaceen und der Fische. Arch. ges. Phys. xxxviii, pp. 521-528, taf. v.

229. MCWILLIAM, J. A. On the Structure of the Intestine in the Hedgehog and Mole. Rep. Brit. Ass. 1885, p. 1078.

In the Hedgehog, though no external differentiation into large and small intestine is visible, there is a marked histological differentiation. In the Mole there is an entire absence of villi.

230. MEAD, J. R. Note on Two Kansas Mammals. Bull. Washb. Coll. i, pp. 91 & 92.

Note on the Black-footed Ferret and the Prairie Dog, and their occurrence in Kansas.

231. MEARNS, E. A. Description of a Rare Squirrel, new to the Territory of Arizona. Bull. Am. Mus. Nat. Hist. i, pp. 197-207.

Complete account of habits and external characters of *Spermophilus (Ictidomys) tereticaudus*, Baird.

232. MENGES, J. Verwilderte Kamele in Arizona. Zool. Gart. xxvii, pp. 37-39.

On a herd of Camels living wild in Arizona, descendants of domestic Camels used in the Mexican war in Texas, fifty years ago. The herd numbers about 150.

233. MERRIAM, C. H. Description of a New Subspecies of the Common Eastern Chipmunk. Am. Nat. xx, pp. 236-242.

Division of *Tamias striatus* into 2 subspecies [cf. *Tamias*].

234. —. Preliminary Description of a New Species of *Aplodontia* (*A. major*, n. sp., "California Show'tl," "Mountain Beaver"). Science, vii, p. 219. [Cf. No. 236.]

- 234A. —. Preliminary Description of a New Squirrel from Minnesota (*Sciurus carolinensis hypophæus*, n. sp.). T. c. p. 351.

235. —. Preliminary Description of a New Pocket Gopher from California. Op. cit. viii, p. 588. [Cf. *Thomomys talpoides perpallidus*, n. subsp.]

236. —. Description of a New Species of *Aplodontia* (*Aplodontia major*, n. sp.) from California. Extr. Ann. N. York Ac. iii, No. 10, pp. 312-328, pls. xix & xx.

237. —. Description of a New Species of Chipmunk from California (*Tamias macrorhabdotes*, n. sp.). P. Biol. Soc. Wash. iii, pp. 25-28.

238. [MERRIAM, C. H.] Description of a New Species of Bat from the Western United States (*Vespertilio ciliolabrum*, n. sp.). P. Biol. Soc. Wash. iv. [Sep. cop. only seen.]
239. —. Description of a Newly-born Lynx, *Lynx canadensis* (Desm.), Raf. Bull. Nat. Hist. Soc. New Brunswick, v, 1886, with pl.
Description of the external markings, which differ from those of the adult, and resemble those of *Felis pardalis*.
240. —. Do any of our North American Bats migrate? Evidence in the affirmative. P. Am. Ass. xxxv, p. 269.
In the case of *Atalapha cinerea* and *Vesperugo noctivagans*.
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Description of a Rodent which forms the type of a new genus, *Eliurus*, allied to *Hypogeomys*, of the family *Muridae*.
243. MOJSISOVICS, A. VON. Zur Fauna von Bélye und Dárda. Säugethiere. MT. ver. Steierm. xx, pp. 122-161.
Notes on the fauna of the district.
244. —. Ueber ein seltenes Geweih. *Op. cit.* xxi, pp. cii & ciii.
On the abnormal antlers of a Stag.
245. —. Bericht über eine Reise nach Südungarn und Slavonien im Frühjahr 1884. *Op. cit.* xxi, pp. 192-208, and xxii, pp. 57-108.
Account of the Slavonia and South Hungary.
246. —. Biologische und faunistische Beobachtungen über Vögel und Säugethiere Sudungarns und Slavoniens. *Op. cit.* xxii [Mammals, pp. 180-203].
Notes on various Mammals, especially the Red and Roe Deer.
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A monograph on the Bats of Italy, with key, description of the species, and synonymy. 18 species are enumerated.
248. —. Contribution to a Knowledge of the South-Italian *Chiroptera*. P. Z. S. 1886, pp. 93-96.
List of Bats from Southern Italy, with a description of *Vespertilio oxygnathus*, described by the author the year before [*cf.* Zool. Rec. xxii, Mamm. p. 39].
249. MOORE, T. J. On the Rocky Mountain Goat. P. Liverp. Soc. xxxix, pp. 265-271.
Notes on specimens shot by Mr. Littledale for the Liverpool Museum in Alaska. [*Cf.* *Haplocerus*]

250. *MOUSSAYE, G. DE LA. Notice sur le *Nesodon*; topographie de la vallée de Wimereux. Boulogne-sur-Mer: 1886, 8vo, 8 pp.

251. MURRAY, J. A. Description of a new *Gerbillus* from Sind. Ann. N. H. (5) xvii, pp. 246-248.

252. NADAILLAC, —. Sur la découverte faite, en Belgique, d'une sépulture de l'âge du Mammouth et du Rhinocéros. C.R. ciii, pp. 490-492.

253. *NEGRINI, F. Sull' anatomia del piede dei bovini: appunti e ricerche. Milano: 1886, 8vo, pp. 1-28, 1 tav.

254. NEHRING, A. Zoologische Sammlung der Königlichen Landwirthschaftlichen Hochschule in Berlin. Katalog der Säugethiere, pp. 1-100, mit 52 Textabbildungen. Berlin: 1886, 8vo.

The museum is particularly rich in skeletons and skulls of domestic animals, such as Horses and Dogs.

255. —. Beiträge zur Kenntniss der *Galictis*-Arten. Zool. JB. i, pp. 177-212.

The author, after an examination of the skulls and other parts of many individuals, finally distinguishes 4 species: 1, *Galera barbara*, L.; 2, *Galictis allamandi*, Bell; 3, *G. vittata*, Bell; 4, *G. intermedia*, Lund.

256. —. Nachträgliches über den japanischen Dachs nebst Bemerkung über die "Scheitellänge" des Schädels. Zool. Gart. xxvii, pp. 47 & 48.

257. —. Der grosse Grison (*Galictis crassidens*, Nrg., resp. *G. allamandi*, Bell). T. c. pp. 274-279.

Note on the identity of the two forms of *Galictis* described respectively by Nehring (SB. nat. Fr. 1885) and Bell.

258. —. Ueber *Furcifer antisienensis*. SB. nat. Fr. 1886, p. 17.

259. —. Ueber japanische Säugethiere, insbesondere über den japanischen Dachs und sein Verhältniss zu *Meles taxus*. T. c. pp. 18-26.

On the specific distinctions between *Meles taxus* and the Japanese form, *M. anakuma*.

260. —. Ueber die Artberechtigung des grossen Grison (*Galictis crassidens*, Nehring, resp. *G. allamandi*, Bell) neben dem kleinen Grison (*G. vittata*, Bell). T. c. pp. 43-55.

261. —. Ueber zwei Schädel des *Sus longirostris*, Nehring, von Borneo und Java. T. c. pp. 80-85.

262. —. Neue Notizen über *Galictis crassidens* resp. *allamandi*, sowie über *G. barbara*. T. c. pp. 95-100.

263. —. Ueber eine neue Sendung mumificirter Inca-Hunde von Ancon in Peru. T. c. pp. 100-102.

264. —. Ueber die Robben der Ostsee, namentlich über die Ringelrobbe. T. c. pp. 119-124.

Notes on the three species of Seals in the Baltic, *Halichoerus grypus*, *Phoca vitulina*, and *P. annellata*.

265. [NEHRING, A.] Ueber einen in der Gefangenschaft gezüchteten täckelbeinigen Hasen. *T. c.* pp. 141-143.

On a cross between *Lepus timidus* and *Lepus cuniculus*, var. dom.

266. —. Ueber *Lutra brasiliensis*, *L. paranensis*, *Galictis crassidens*, und *Galera macrodon*. *T. c.* pp. 144.

Notes on these animals.

267. —. Ueber die Abstammung unserer Hausthiere. *JB. und Abb. Nat. Ver. Magdeburg*, 1885, pp. 129-144.

Notes on the origin of the various domestic animals.

268. * —. Ueber altperuanische Hundemumien und über Rassebildung bei der sogenannten Inca-Hunden. *Verh. Berlin anthropol. Ges.* 1885, pp. 518-521.

269. NEVILL, H. Notes on Mammals. *Taprobanian*, i, pp. 1 & 2.

Note on the Brown Bear of Ceylon (*Ursus inornatus*), on the Wild Cats and Dugongs.

270. —. *Felis moormensis* and *Leopardus pardus* var. *T. c.* pp. 33 & 34.

Note as to the reported occurrence of *F. moormensis* in Ceylon, and note on a variety of Leopard met by the author.

271. —, & BLIGH, H. *Herpestidae* in Ceylon. *Taprobanian*, i, pp. 58-63.

Notes on the various species and their habits. Mr. Nevill gives a list of those occurring in Ceylon, 7 in number: *H. smithi*, *griseus*, *jerdoni*, *flavidens*, *Onychogale maccarthiae*, and *O. ceylonicus*, n. sp., and *Urva vitticollis*.

272. NEWTON, E. T. A Contribution to the History of the *Cetacea* of the Norfolk Forest Bed. *Q. J. Geol. Soc.* xlii, pp. 316-324, pl. xi.

On the occurrence of *Physeter macrocephalus* and *Balena biscayensis* in the forest bed for the first time.

273. NIKOLSKAGO, A. M. Material k poznaniyn phayni pozvonotschnich gebotnich sybero-Vostotschnoi Persie e Zakaspiiskoi oblacte. *Trud. Petersb.* xvii, pp. 379-386.

Materials towards the knowledge of the vertebrate animal fauna of the north-east Persian and Transcaspian provinces. Gives a list of Mammals.

274. NOAK, T. Neues aus der Tierhandlung von Karl Hagenbeck, sowie aus dem zoologischen Garten in Hamburg. *Zool. Gart.* xxvii, pp. 39-47 & 75-83, mit 2 Abbild.

Notes on certain Antelopes, &c. [*cf. Gazella*, *Strepsiceros*, *Antilope*, *Nemorhædus*, *Cervus*, *Cariacus*], on certain Carnivores [*cf. Felis*, *Nandinia*, *Genetta*], and on 2 Rodents [*cf. Aulacodus* and *Sciurus*].

275. —. Ueber das zottelohrige Nashorn (*Rhinoceros lasiotis*). *T. c.* pp. 138-144, mit 1 Abbild.

Notes on the external anatomy.

276. —. Ein neuer Canide des Somalilandes. *T. c.* pp. 233-237, with woodcut.

Description of *Canis hagenbeckii* from Somaliland.

277. NÖRNER, C. Ueber den feineren Bau des Pferdehufes. *Arch. mikr. Anat.* xxviii, pp. 171-224, taf. xv.

On the anatomy and histology of the Horse's hoof.

278. NOTT, J. F. *Wild Animals Photographed and Described*. London : 1886, roy. 8vo, pp. 1-568.

Reproductions in black and white of a series of photographs of the animals in the Zoological Society's Gardens, with appended popular descriptions.

279. OLIVER, S. P. *Madagascar : an Historical and Descriptive Account of the Island and its former Dependencies*. Vols. I & II. London : 1886, 8vo.

Chapter viii (Vol. I, p. 510) contains an account of the natural history of Madagascar, with a list of the Mammals.

280. ONODI, A. D. Ueber die Entwicklung des sympathischen Nervensystems. *Arch. mikr. Anat.* xxvi (Mammals, pp. 568-580), taf. xxv-xxvii.

281. OSBORN, H. F. The Origin of the Corpus Callosum, a contribution upon the Cerebral Commissures of the *Vertebrata*. *Morph. JB.* xii, pp. 223-251, pls. xiii & xiv.

The object of this essay is to prove that the upper commissure of the Amphibian brain represents the corpus callosum, while the lower commissure represents the anterior commissure of higher forms.

282. —. Observations upon the Upper Triassic Mammals, *Dromatherium* and *Microconodon*. *P. Ac. Philad.* 1886, pp. 359-363 ; also *Science*, viii, p. 540.

Redescription of *Dromatherium sylvestre* of Emmons ; another jaw, identified by Emmons as *D. sylvestre*, is redescribed as *Microconodon tenuirostris*, nn. g. & sp.

283. OWEN, [SIR] R. On the Premaxillaries and Scalpriform Teeth of a Large Extinct Wombat (*Phascolomys curvirostris*, Ow.). *Q. J. Geol. Soc.* xlii, pp. 1 & 2, pl. i.

Description of a jaw-bone from the Wellington bone caves, N. S. W.

284. PACKARD, A. S. On the Former Southern Limits of the White or Polar Bear. *Am. Nat.* xx, pp. 655-659.

285. PANTANELLI, —. *Vertebrati fossili delle ligniti di Spoleto*. *Atti Soc. Tosc.* vii, pp. 93-99, tav. ix.

Descriptions of remains of *Mastodon arvernensis*, *M. borsoni*, and *Tapirus arvernensis*.

286. PARKER, W. K. On the Structure and Development of the Skull in the *Mammalia*. Part II. *Edentata*. *Phil. Tr.* clxxvi, pp. 1-119, pls. i-xv. Part III. *Insectivora*. *Phil. Tr.* clxxvi, pp. 121-275, pls. xvi-xxxix.

The development of the skull is described in detail in all the principal modifications of the Edentate group, and in a summary at the end of the volume is contained a few remarks on the most noticeable points in the

Edentate skull; no general conclusions are given, however, except that there is a very close relation between the *Edentata* and the Monotremes. In the second paper, dealing with the *Insectivora*, the native forms (*i.e.*, Shrew Mole and Hedgehog) are fully treated of, but among exotic forms the author was short of material. In a summary, the Hedgehog is shown to be the most generalized type of *Insectivora*, and is compared with the Marsupial. A curious discovery also is that *Erinaceus* possesses no less than five vomers; two other features are the very large Meckel's cartilage and a persistent pituitary hole.

287. PARKER, W. N., & WIEDERSHEIM, R. Elements of the Comparative Anatomy of Vertebrates. London: 1886, 8vo, pp. 1-345, 270 woodcuts.

Translation, with considerable additions, of Wiedersheim's well-known Grundriss.

288. PEGLER, H. S. H. The Book of the Goat. London: 1886, 8vo, 3rd ed., pp. 1-222.

289. PELZELN, A. VON. Eine Studie über die Abstammung der Hunderrassen. Zool. JB. i, pp. 225-240.

The author distinguishes six different races of dogs, all with a different ancestral history: (1) The Wolf race, derived from *Canis lupus*; (2) the Spitz-dog race, from some extinct quaternary species of *Canis*; (3) the Jackal race, from *Canis aureus*; (4) the Greyhound race, from *Canis simensis*; (5) the Hunting Dog, whose ancestry seems uncertain; (6) the Indian Ocean Dog, from *Canis pallipes*.

290. —. Chlorochroismus Geraiochroismus Melanismus und Albinismus. MT. Ver. Steierm. xx, pp. 84-90.

On the abnormal colouration of some Birds and Mammals.

291. — & KOHL, F. F. Ueber eine Sendung von Säugethieren und Vögeln aus Ceylon. Verh. z.-b. Wien, xxxv, pp. 525 & 526.

Four Mammals are mentioned; among them a dark variety of *Sciurus palmarum*, Briss., from the mountain region.

— [See FISCHER (120).]

292. PILLIET, A. Sur la texture musculaire de l'utérus dans la série des mammifères. Bull. Soc. Z. Fr. 1886, pp. 420-460.

A certain number of results are tabulated at the end of the paper, the principal being that in the Mammalian oviduct there are two muscular tunics corresponding to those of the intestine, and that there is no mucous muscular coat.

293. — & BOULART, R. Sur l'estomac de l'Hippopotame, du Kangaroo de Bennett et du Paresseux Ai. J. de l'Anat. Phys. xxii, pp. 402-423, pl. xv.

294. PETHÜ, J. Ueber die fossilen Säugethier. Ueberreste von Baltavár. JB. k. ungar. geol. Anstalt. 1884, pp. 455-464.

Description of the remains of various fossil *Mammalia*, including one new species, *Chalicotherium baltavarensis*; also a table showing the dis-

tribution of these Pliocene Mammals in the beds of Baltavár, Pikermi, Mount Lebanon, Concord, and Eppelsheim.

295. PLESKE, T. Nachtrag zu den Säugethieren der Kola-Halbinsel. Beitr. Russ. Reiches (2) ix, pp. 423-439.

Supplement to a list published *op. cit.* vii on the Mammals of the Kola peninsula, with additional notes on some of the Mammals.

296. POHLIG, H. Ueber das Verhältniss des persischen Wildschafes, *Ovis orientalis*, zu dem indischen aus dem Pendsch-Aab, *Ovis cycloceros*. Verh. Ver. Rheinl. (= SB. Ges. Bonn), xliii, pp. 92 & 93.

297. —. On the Pliocene of Maragha, Persia, and its Resemblances to that of Pikermi in Greece; on Fossil Elephant Remains of Caucasia and Persia; and on the results of a Monograph of the Fossil Elephants of Germany and India. Q. J. Geol. Soc. xlii, pp. 177-282.

298. PONSARD, —. Note sur les moutons chinois prolifiques. Bull. Soc. Acclim. (4) iii, pp. 241-243.

299. PORTIS, A. Catalogo descrittivo dei Talassoterii, rinvenuti nei terreni terziarii del Piemonte e della Liguria. Mem. Acc. Tor. (2) xxxvii, pp. 247-365, taf. i-ix.

Description of extinct Cetaceans and Sirenians [*cf. Balenoptera, Priscophyseter, Hoplocetus, Physotherium, Steno, Felsinotherium, &c.*].

300. POUCHET & BEAUREGARD. Note sur l'organe des Spermaceti. C.R. Soc. Biol. (8) ii, pp. 342-344.

301. —. Note sur le développement des Fanons. T. c. pp. 477 & 478.

302. PROBST, J. Der Riesenhirsch von Ellwangen (*Cervus euryceros*?). JH. Ver. Württ. xlii, pp. 52-57.

303. —. Ueber die fossilen Reste von Zahnwalen (Cetodonten) aus der Molasse von Baltringen O.-A. Laupheim. T. c. pp. 102-145, taf. iii.

Description of several new species of fossil Whales from Baltringen, with accounts of several species already described. [*Cf. Physodon, Hoplocetus, Ziphioides, and Champsodelphis.*]

304. QUIROGA, F. Apuntes de un viaje por el Sáhara occidental. An. Soc. Esp. xv.

Mammals observed, p. 522.

305. RABL-RÜCKHARD, H. Zur Albrecht-Köl liker'schen Streitfrage über die vordere Endigung der Chorda dorsalis. Anat. Anz. i, pp. 200-203.

Further contribution to the controversy as to the existence of the notochord in the nasal septum of an embryo Cow. [*Cf. ALBRECHT (10).*]

306. RADDE, G. Die Fauna und Flora des südwestlichen Caspi-gebietes. Leipzig: 1886, 8vo, pp. 1-425, 3 taf. [Mammals, pp. 3-11.]

307. RAILLIET, A. Éléments de Zoologie médicale et agricole. Paris: 1885-1886, 8vo, pp. 1-1053, avec 705 fig.

Text-book; account of Mammals, pp. 807-1000.

308. RÉGNAULT, F. Un repaire d'Hyènes dans la grotte de Gargas. Bull. Soc. Toulouise, xix, pp. 30-32.

309. REICHENOW, A. Handwörterbuch der Zoologie, Anthropologie, und Ethnologie. Vols. III. & IV. In the Encyklopædie der Naturwissenschaften. Breslau : 1885-1886, 8vo.

Vol. III, *Elopini-Haliotis*. Vol. IV, *Halithea*-Landrace. Principal articles vol. III : on *Felis*, p. 110 ; geographical distribution, p. 373 ; on the history of Mammalogy, p. 600. Vol. IV : *Insectivora*, p. 302.

310. —. Zwei neue Säugethiere aus Inner-Africa. Zool. Anz. ix, pp. 315 & 316. [Cf. *Sciurus* and *Rhynchocyon*.]

RÉVOLLE. [See DEPÉRET (98).]

311. RETTERER, E. Sur le mode de développement des cavités articulaires chez les mammifères. C.R. Soc. Biol. (8) iii. pp. 45-48.

312. —. Type commun des amygdales chez les Mammifères. T. c. pp. 557-559.

On Mammalian tonsils.

313. REX, H. Ein Beitrag zur Kenntniss der Muskulatur der Mundspalte der Affen. Morph. JB. xii, pp. 275-285, taf. xvii.

314. RIVIÈRE, E. Le gisement quaternaire du Perreux (Seine). C.R. Ass. Fr. Sci. xiv, 2nd part, pp. 401-407.

Gives the Vertebrates of this formation, i.e., *Elephas primigenius*, *Rhinoceros tichorhinus*, &c.

315. ROCHEBRUNE, A. T. Du platyrrhinisme chez un groupe de Singes africains. C.R. ciii, pp. 940 & 941.

Note showing that the genus *Colobus* is platyrrhine, and should be separated by a wide interval from the rest of the African Monkeys, and that in this platyrrhinism it is allied to the American Monkeys.

316. —. De la confirmation des organes géuitaux externes chez les femelles de singes anthropomorphes du genre *Troglodytes*. T. c. pp. 1084-1086.

Description of these parts from a living ♀ *Troglodytes niger*.

ROEBUCK. [See CLARKE (68).]

317. ROGER, O. Kleine paläontologische Mittheilungen. Ber. Ver. Augsburg, xxviii, pp. 93-118, mit 3 taf.

I. On two problematic fossils from the Dinotherium sands of Mering, near Augsburg : the author interprets them to be the horn and nasal bones of *Chalicotherium* sp. ?. II. On Mammal remains from Reischenau, in Swabia, containing descriptions of various Mammals, including *Trimylus schlosseri*, n. g. & sp., and *Hystrix wiedemanni*, n. sp. III. On *Dinotherium* remains from Breitenbronn ; description of remains of *D. bavarium*.

318. ROSENBERG, E. Ergebnisse einer Fortsetzung seiner Untersuchungen über die Wirbelsäule der Säugethiere. SB. Ges. Dorp. vii, pp. 366 & 367.

On the number of the cervical vertebræ in *Halicore* and *Manatus*.

319. ROSENBERG, L. Ueber Nervenendigungen in der Schleimhaut und im Epithel der Säugethierzunge. SB. Ak. Wien, xciii, 3^{te} Abt., pp. 164-198, taf. i. & ii.

On the various forms of sense end-organs in the tongue of Mammals.

320. ROUX, W. Ueber eigenartige Kanäle in recenten und fossilen Knochen. Anat. Anz. i, pp. 276 & 277.

On a canal-system found in certain fossil bones, especially those of *Rhytina*, probably due to a fungus (*Mycelites ossifragus*, Roux).

321. RUGE, G. Untersuchungen über die Gesichtsmuskulatur der Primaten. Leipzig : 1887 [1886], folio, pp. 1-130, mit 8 taf.

Account of the facial myology of various members of the group *Primates*, such as *Cebus*, *Ateles*, *Hapale*, *Cynocephalus*, *Inuus*, Orang, and Man.

322. RYDER, J. A. The Origin of the Amnion. Am. Nat. xx, pp. 179-185.

The mechanical explanation of the formation of the amnion by the too rapid growth of the embryo, especially at the head end, by its down-sinking into the yolk, and by the closing of the double layer so formed over the back of the embryo.

323. SACK, A. Ueber die Verbindung der Crura penis mit dem Becken bei Beutelhieren. Zool. Anz. ix, pp. 164-166.

The author points out that in *Phascogale flaviceps* the "crura" penis spring from and are attached to the ischium, which is a point hitherto said to be characteristic of *Monodelphis* as opposed to *Didelphis*.

324. SAINT-HILAIRE, A. G. Note sur les chiens de prairie. Bull. Soc. Acclim. (4) iii, pp. 384-387.

Notes on their habits in captivity.

325. SANCHEZ, J. El castor, el mico de noche y el hormiguero. Nat. Mex. vii, pp. 324 & 325.

Note on *Castor fiber*, *Cycloturus didactylus*, and *Tamandua tetradactyla*.

326. SANTOS, F. M. On a new or critical species of Monkey, and a systematical arrangement of a group of *Cercopithecus*. J. Sci. Lisb. xlii, p. 95.

327. SCHÄFF, E. Ueber *Lagomys rutilus*, Severtzoff. Zool. JB. ii, pp. 65-72, mit 6 Holzschnitten.

A fresh description of this Hare, which has never been studied since the original description in Ann. N. H. 1876, xviii, p. 168.

328. —. Ein neu-geborenes Hengstfohlen vom Dschiggetai (*Equus hemionus*). Zool. Gart. xvii, pp. 259 & 260.

329. SCHIEFFERDECKER, P. Studien zur vergleichenden Histologie der Retina. Arch. mikr. Anat. xxviii, pp. 305-396, taf. xxii-xxiv.

A study of the supporting cells (stützzellen) of the retina in Vertebrates.

330. SCHLOSSER, M. Beiträge zur Kenntniss der Stammesgeschichte der Hufthiere und Versuch einer Systematik der Paar- und Unpaarhufer. Morph. JB. xii, pp. 1-136, taf. i-vi. [See also Cope, Am. Nat. xx, p. 965; Zool. Anz. ix, pp. 252-256, 432 & 433; and Geol. Mag. (3) iii, pp. 326-328.]

An important contribution to the phylogeny of Ungulates. Contains an account of the various genera of Perissodactyles and Artiodactyles, with suggestions towards their classification; then follows the description of several new genera, *Cryptomeryx*, *Phaneromeryx*, *Protomeryx*, and *Haplomeryx*. The General Part contains a comparison of the Perissodactyles and Artiodactyles with the *Condylarthra*, the discovery of which the author considers as most important for the elucidation of the Ungulate phylogeny; also an account of the relations of the Ungulates to other Mammals. Then follow the conclusions, in which the author generally agrees with Cope's views.

331. —. Ueber das Verhältniss der Cope'schen *Creodonta* zu den übrigen Fleischfressern. T. c. pp. 287-294.

The author does not believe that the *Creodonta* are more particularly related to the *Carnivora* than to the *Insectivora*, but that they form an independent order of themselves.

332. —. Die Palæomeryxarten. T. c. pp. 294-296.

A list of the species of *Palæomeryx* in the Munich Museum.

333. SCHMIDT, E. Ueber die Wirbelsäule der Primaten. CB. Ges. Anthrop. xvii, pp. 5 & 6.

Shows that the differences in the vertebral column between Man and other Primates is due to the assumption of the upright bipedal position.

334. SCHMIDT, M. Der graue Gibbon, *Hylobates leuciscus* (Schreb.), des zoologischen Gartens in Berlin. Zool. Gart. xxvii, pp. 7-14.

Description, account of the habits, and measurements of this Gibbon.

335. —. Mittheilungen aus dem zoologischen Garten zu Berlin. T. c. pp. 7-14.

Contains notes on (1) the antlers of the Reindeer; (2) variations in the litter of a Pig of a peculiar breed; (3) a rare Monkey [cf. *Callithrix*]; (4) the Orang.

336. SCLATER, P. L. Note on the External Characters of *Rhinoceros simus*. P. Z. S. 1886, pp. 143 & 144, pl. xvi.

Rhinoceros simus is easily distinguished from *R. bicornis* by its short upper lip and by its pointed ear-conch, topped not by a fringe but by a tuft of hairs.

337. —. Remarks on the Various Species of Wild Goats. T. c. pp. 314-318, pls. xxxi & xxxii.

The species of the genus *Capra* recognized by the author are ten in number. An account of their distribution is added.

338. [SCLATER, P. L.] Note on Two Species of Monkeys (*Macacus tcheliensis* and *Brachyurus calvus*) added to the Zoological Society's Gardens. *T. c.* p. 417.

339. —. On Two Species of Antelopes from Somali-Land. *T. c.* pp. 504 & 505, pl. li.

Description of a new species of *Gazella*, and remarks on a species of *Neotragus*.

340. SCOTT, W. B. On some New Forms of the *Dinocerata*. *Am. J. Sci.* xxxi, pp. 303-307.

Contains the description of a new genus of *Amblypoda*, intermediate between *Coryphodon* and the *Dinocerata*, though more allied to the latter (*Elachoceras*); also a description of a new species of *Uintatherium*.

341. —. Some Points in the Evolution of Horses. *Science*, vii, p. 12.

Describes the gradual formation of the pitted incisors in the line of equine forms, especially in *Hyracotherium* and *Anchitherium*.

342. SELENKA, E. Studien über Entwicklungsgeschichte. 4tes Heft, Erste Hälfte. Das Opossum (*Didelphys virginiana*). Wiesbaden : 1886, 4to, pp. 101-132, mit 9 taf.

The yolk-sac is very large and vascular; an allantois with blood-vessels is present, but never meets the chorion so as to form a placenta; the embryo is free in the uterus very late, and it is some time before the amnion closes at the top.

343. SETON, E. T. The Ruminants of the North-West (3) iii, pp. 113-117.

Contains a description of a new variety of Buffalo, the Wood Buffalo.

344. SHUFELDT, R. W. Another Carnivorous Rodent. *Science*, viii, p. 102.

On the carnivorous propensities of *Cynomys ludovicianus*, the Prairie Dog.

345. SIGEL, W. L. Die junge Giraffe des zoologischen Gartens in Hamburg. *Zool. Gart.* xxvii, pp. 1-7, 1 pl.

346. —. Das Nilpferd des zoologischen Gartens in Hamburg. *T. c.* pp. 106-114, mit 1 Abbild.

On the hair and teeth of the Hippopotamus.

347. SMETS, G. Notes sur la tête d'un fœtus de *Balenoptera sibbaldii* (Gray). *Ann. Soc. Brux.* ix.

An account of the skull as far as it was developed in the young fœtus of this Whale.

348. SOUTHWELL, T. Notes on the Seal and Whale Fishery, 1885. *Zool.* (3) x, pp. 98-102.

349. —, & CLARKE, W. E. On the Occurrence of Sowerby's Whale (*Mesoplodon bidens*) on the Yorkshire Coast. *Ann. N. H.* (5) xvii, pp. 53-59.

350. STEEL, J. H. A Manual of the Diseases of the Elephant, and of His Management and Uses. Madras: 1885, 8vo, pp. 1-99, 10 pls.

A good general account of the Elephant in captivity is given, and of its uses and domestication. The second part contains details on its anatomy and pathology.

351. STERNDALE, R. A. Note on a probable New Species of *Iber. J.* Bombay N. H. Soc. i, pp. 24-26, 1 pl.
352. —. On a Hybrid, *Ovis hodgsoni*, cum *vignei*, discovered and shot by Mons. H. Dauvergne. *T. c.* pp. 35-37, 1 pl.
353. —. I. On Variation in Colour in *Ursus labiatus*, the Sloth Bear, &c. II. On the Flying Squirrel of Western Asia. III. On a Species of Pigmy Shrew. *T. c.* pp. 69, & 70.
354. —. On a Case of Hybridism between *Ovis hodgsoni* and *O. vignei*. P. Z. S. 1886, pp. 205 & 206.

The hybrids were between a ram of *O. hodgsoni* and a flock of *O. vignei* ewes, and occurred in a mountain range south of the Indus, near Lanskar.

355. —, & AITKEN, E. H. Catalogue of the *Mammalia* in the Collection of the Bombay Natural History Society. J. Bombay N. H. Soc. i, pp. 8-14.

The museum contains examples of 48 species of Mammals.

STOREY. [See CLARKE (68).]

356. STOWELL, T. B. The Trigeminal Nerve in the Domestic Cat (*Felis domestica*). P. Am. Phil. Soc. xxiii, pp. 459-478.

An anatomical account of the trigeminal; its origin, and distribution of its various branches.

357. STRAHL, H. Zur Bildung der Cloake des Kaninchenembryo. Arch. Anat. Phys. 1886, pp. 156-168, taf. iv.

358. STRUTHERS, —. On the Tay Whale (*Megaptera longimana*) and other Whales recently obtained in the district. Rep. Brit. Ass. 1885, pp. 1053 & 1054.

[Cf. *Megaptera* and *Balenoptera*.]

359. STYAN, F. W. Letter from, relating to some Chinese animals. P. Z. S. 1886, pp. 267 & 268.

Description and measurements of the skin of a ♀ *Cervulus crinifrons*.

360. SUTTON, J. B. An Introduction to General Pathology. London: 1886, 8vo, pp. 1-390.

The examples of disease described in this volume are chiefly derived from the lower animals. The volume concludes with a chapter of generalization, and on the bearing of pathology on evolution.

361. —. On Atavism. A Critical and Analytical Study. P. Z. S. 1886, pp. 551-558.

The author wishes to prove that all cases of atavism are, as Gegenbaur calls it, Palæogenetic, i.e., that the abnormal part is always found as a germ in the embryo.

362. —. On some Specimens of Disease from Mammals in the Society's Gardens. *T. c.* pp. 206-217.

The theory that the vertical attitude of Man has produced such diseases as prolapse of the uterus and crural and inguinal hernia is shown to be

false, since examples of these diseases have been found in the lower Mammals; examples are also given of perforating ulcer, due to sclerosis of the spinal cord; also several illustrations of symmetry in disease.

363. *TAFANI, A. L'organo dell' udito, nuove indagini anatomiche comparate. Arch. Scuola Anat. patol. Firenze, iii, pp. 1-371, 87 incis.

364. TÉGLÁS, G. A Buhuj (Bagolyvár) nevű csontbarlang stájerlakánina határában. Math. term. köz. xix, pp. 2-13.

On a bone cave at Bagolyvár, in Styria, containing remains of *Ursus spelæus* and *Capra*.

365. TEPLOUCHOFF, A. E. Moschusochse. Arch. f. Anthrop. xvi, pp. 519-521.

366. THOMAS, O. Description of a New Brazilian Species of *Hesperomys*. Ann. N. H. (5) xvii, pp. 250 & 251.

367. —. Note on *Hesperomys pyrrhorhinus*, Pr. Max. Op. cit. xviii, pp. 421-423.

Names a species before [P. Z. S. 1882, p. 98] identified as *H. pyrrhorhinus*, *H. pyrrhonotus*.

368. —. On the Mammals presented by Allan O. Hume, Esq., C.B., to the Natural History Museum. P. Z. S. 1886, pp. 54-79, pls. v & vi. [See also Ann. N. H. (5) xvii, p. 84.]

Account of the Hume collection of Mammals, 400 in number, referable to 106 species, of which 2 are new [*cf. Mus* and *Sciuropterus*]. The collection was almost entirely made in four separate localities—Sambhar (in Rajpootana), Manipur (between Burma and Assam), Tenasserim, and the Malay Peninsula; four separate lists are given of the Mammals from each of these four localities.

369. —. Notes on a Striking Instance of Cranial Variation due to Age. T. c. pp. 125-127, pl. xi.

Description of the differences between three skulls (one aged, one adult, and one ♀) of the Canadian Marten (*Mustela pennanti*).

370. —. On the Wallaby commonly known as *Lagorchestes fasciatus*. T. c. pp. 544-547, pl. lix.

Proposes to form a new genus, *Lagostrophus*, for the form hitherto known as *Lagorchestes fasciatus*.

371. —. Article Rat. Encycl. Brit. xx, p. 287.

372. —. Article Ratel. T. c. p. 288.

372A. — & DORIA, G. Note intorno ad alcuni Chiroterteri appartenenti al Museo Civico di Genova e descrizione di due nuove specie del genere *Phyllorhina*. Ann. Mus. Genov. (2) iv, pp. 201-207.

Descriptions of two new species of Bats [*cf. Phyllorhina*], with notes on two others.

372B. —. Diagnosis of a New Species of *Phascogale*. T. c. iv, p. 208.

373. TORNIER, G. Fortbildung und Umbildung der Ellbogengelenks während der Phylo-genesis der einzeluen Säugethiergruppen. Morph. JB. xii, pp. 406-413.

374. TOUCHARD, A. Les Chiens de Prairie (*Cynomys ludovicianus*). Bull. Soc. Acclim. (4) iii, pp. 561 & 562.

375. TROTTER, S. The Mammary Gland of the Elephant. Am. Nat. xx, pp. 927-931.

An essay showing that the mammary glands of the Elephant are pectoral and not inguinal, because the slope of the belly line is downward and backward, not upward and backward as in *Ungulata*; and that, therefore, the pectoral mammary glands are more easily got at by the young Elephant than inguinal glands would be.

376. TROUESSART, E. L. La phylogénie du Cheval et la théorie de la convergence, à propos du récent discours de M. Carl Vogt. Rev. Sci. xii, pp. 557-559.

377. TRUE, F. W. A Means of Distinguishing the Canada Lynx from the Bay Lynx. Science, vii, p. 396.

In *Lynx canadensis* the anterior condyloid foramen and the foramen lacerum posterium are not confluent; in *Lynx rufus* these two foramina are confluent.

378. —. A New Bat from Puget Sound. *Op. cit.* viii, p. 588.

Vespertilio longicrus.

379. —. On a Spotted Dolphin apparently identical with the *Prodelphinus doris* of Gray. Ann. Rep. Smith. Inst. 1884, pt. ii, pp. 317-324, pls. i-vi.

Description of external characters and osteology of this Cetacean from the Gulf of Mexico.

380. —. The Florida Musk Rat (*Neofiber alleni*, True). *T. c.* pp. 325-330, pls. i-iii.

Additional information with regard to this new Mammal.

381. —. Description of a New Genus and Species of Mole, *Dymecodon pilirostris*, from Japan. P. U. S. Nat. Mus. ix, pp. 97 & 98.

382. —. An Annotated List of Mammals collected by the late Mr. Charles L. McKay in the vicinity of Bristol Bay, Alaska. *T. c.* pp. 221-224.

List containing 23 species of Mammals.

383. —. A New Study of the Genus *Dipodomys*. *T. c.* pp. 409-413.

The author recognizes 2 species of *Dipodomys*, *D. phillipsi*, with four toes to the hind foot, *D. agilis*, with five toes to the hind foot.

384. —, & LUCAS, F. A. On the West Indian Seal (*Monachus tropicalis*, Gray). Ann. Rep. Smith. Inst. 1884, pt. ii, pp. 331-335, pls. i-iii.

Description of the skin and skull of this rare Seal.

385. TURNER, SIR W. On the Occurrence of the Bottle-nosed or Beaked Whale (*Hyperoodon rostratus*) in the Scottish Seas, with Observations on its External Characters. P. Phys. Soc. Edinb. ix, pp. 25-47.

A list of the recorded occurrences of this Whale on British coasts, remarks on its external anatomy and dentition, and a reproduction of a photograph of the specimen examined by Prof. Turner.

386. VITI, A. Il nervo depressore nell' uomo e negli altri Mammiferi ricerche di morfologia comparata. Atti Soc. Tosc. vi, pp. 151-248, tav. xii-xviii.

The origin and distribution of the depressor branch of the vagus is described and figured in several of the more important Mammalian types.

387. WALDEYER, W. Beiträge zur normalen und vergleichenden Anatomie des Pharynx, mit besonderer Beziehung auf den Schlingweg. SB. Ak. Berlin, 1886, pp. 233-250.

Account of the pharynx and larynx in a considerable number of Mammals.

388. WALECKIEGO, A. Przyczynek do fauni Teryologicznój Kraju *Sminthus*. Pamietnika Fizyjo-graficznego, iv (1884), pp. 272-292, tab. iv.

389. —. Supplément à l'histoire des animaux rongeurs de la Pologne. Arch. slav. Biol. i, pp. 228 & 229.

Translation of No. 388. Note on the occurrence of *Sminthus subtilis* in Poland, with description of its external characters and anatomy.

390. WEBER, M. Studien über Säugethiere. I. Beiträge zur Anatomie von *Hippopotamus amphibius*. II. Ein Beitrag zur Frage nach dem Ursprung der Cetaceen. Jena: 1886, 8vo, pp. 1-252, mit 4 taf.

I contains an account of the histology of the skin, and also the history of a blood-coloured exudation frequently seen on the skin of the young Hippopotamus; this exudation is not connected with the blood as was supposed, but is of a glandular nature. II contains a full account of the anatomy of Whales as compared with other Mammals. The author adopts (p. 25) Flower's classification. He concludes (p. 244) that *Cetacea* are derived from some such form as *Zeuglodon*, more nearly allied to the *Pinnipedia* than to the Ungulates, although having affinities to each.

391. WELLS, J. W. Exploring and Travelling Three Thousand Miles through Brazil. Vols. I & II. London: 1886, 8vo.

Some notes on the Mammalian fauna of Brazil. Vol. I, p. 225; vol. II, pp. 133, 140, & 165.

392. WESTHOFF, —. Der Fledermausfang im Harixbecker Felsenbrunnen am 16 März, 1886. JB. westf. Ver. 1885, pp. 40-43.

Account of an expedition in search of hibernating Bats, of which a large number, belonging to six species, were found.

393. WESTLING, C. Beiträge zur Kenntniss des peripherischen nerven-systems. Bih. Sv. Ak. Handl. ix, No. 8, 3 taf.

Notes on the peripheral nervous system and myology of the Chimpanzee and *Ornithorhynchus*.

394. WHITEAVES, J. F. Colonial Exhibition. Catalogue of Canadian *Pinnipedia*, *Cetacea*, Fishes, and Marine *Invertebrata* exhibited by the Department of Fisheries of the Dominion Government. Ottawa: 1886, 8vo [Mammals, pp. 3 & 4].

395. WIEDEMANN, A. Nachträge zu dem Berichte über die im Regierungsbezirke von Schwaben und Neuburg vorkommenden Säugethiere. Ber. Ver. Augsburg, xxviii, pp. 69-84.

396. WIEDERSHEIM, R. Lehrbuch der vergleichenden Anatomie der Wirbelthiere. Zweite auflage. Jena: 1886, 8vo, pp. 1-890.

— [See PARKER (287).]

397. WILCKENS, M. Palaeontologie der Haustiere. 9. Die vorgeschichtlichen und die Pfahlbau-Hunde. Biol. Centralbl. v, pp. 719-729 & 751-757.

A critical review of all that has been written on fossil and sub-fossil Dogs.

398. —. Untersuchung über das Geschlechtsverhältnis und die Ursachen der Geschlechtsbildung bei Haustieren. *Op. cit.* vi, pp. 503-510.

The author finds that during a warm time of year more males, during cold more females, are produced; that the age of the male and the generative energy of the female has no influence on the sex of the young produced; the principal influence is the nourishment of the embryo in the body of the mother—with better nourishment females, with worse nourishment males, are produced. The experiments were made principally on Horses and Lambs.

399. —. Die Rinderrassen Mittel-Europas. Grundzüge einer Naturgeschichte der Hausrinds. Berlin: 1885, 8vo, pp. 1-200, 70 taf.

400. WILSON, E. Notes on a Common Fin Whale (*Physalus antiquorum*, Gray) lately stranded in the Bristol Channel (= *Balenoptera musculus*). P. Bristol Soc. iv, pp. 204-210.

Measurements and external characters, with a beautiful platinotype photograph.

401. WINDLE, B. C. A. Notes on the Myology of *Midas rosalia*, with Remarks on the Muscular System of Apes. P. Birmingham. Phil. Soc. v, pp. 152-166.

402. WINTLE, H. S. The Fossil Mammalian Remains of Tasmania compared with those of the Australian Mainland. Victorian Nat. iii, pp. 27-34, 40-45, & 65-68.

The author points out the almost complete absence of the typical Australian extinct Mammals from Tasmania, those that have been brought

to light being mostly recent species. He also comments on and explains the extinction of *Sarcophilus* and *Thylacinus* on the continent, and their survival on the island.

403. WINWOOD, H. H. List of Fossil *Mammalia* found near Bath. P. Bath N. H. & Ant. Club, vi, p. 95.

Supplement to a paper by Charles Moore in 1869, read before the same club, giving the list of fossil *Mammalia* found since that time.

404. WOLDRICH, J. N. Zur Frage über die Abstammung der europäischen Hunderacen. Anz. Ak. Wien, 1886, pp. 12-16.

405. WOODWARD, H. Prof. E. D. Cope, on a New Type of Perissodactyle Ungulate from the Wasatch Eocene of the Wyoming Territory, United States of North America. Geol. Mag. (3) iii, pp. 49-52, pl. ii. Description of Cope's remarkable form *Phenacodus*.

406. —. Recent and Fossil *Hippopotami*. T. c. pp. 114-118, pl. iii.

Besides the two recent species, *H. amphibius* and *H. liberiensis*, the author mentions 3 species from the Siwaliks, one (pleistocene) from Algeria, 1 (*H. minutus*) from Malta, and 1 (*H. pentlandi*) from near Palermo, in Sicily.

III.—SUMMARY OF WORK ON THE GENERAL SUBJECT.

1. COMPARATIVE ANATOMY.

(a.) *Epidermic Structures.*

ALLEN (13). On the arrangement of the cusps of the molars in different Mammals.

CANALIS (61). On the development of teeth in Mammals.

(b.) *Osteology.*

ANDERSON (20). On the pelvisternum.

BARDELEBEN (30A). On the carpus and tarsus.

BAUR (34). On the homologies of the Mammalian ear-bones, and on the quadrate in Mammals.

— (33). On the morphology of the Amniote vertebra.

— (31). On the canals in the Amniote humerus.

FICALBI (113). On the interparietal and parieto-frontal in Mammals.

— (114). On the centres of ossification in the periotic capsule of Mammals.

KEHRER (172). On the morphology of the carpus and tarsus.

LAVOCAT (200). On the vertebral column of Vertebrates.

LEBOUCQ (201). On the morphology of the Mammalian tarsus and carpus.

RETTNER (311). On the formation of articular cavities.

ROSENBERG (318). On the vertebral column of Mammals.

TORNIER (373). On the elbow-joint, and its relation to phylogeny.

(c.) *Nervous Structures and Sense Organs.*

- BAGINSKY (25). On the origin of the 8th nerve in the Cat.
 DOGIEL (102). On the nerve supply of the iris muscle.
 HASSE (151). On the blood-vessels in the inner ear of Vertebrates.
 JEGOROW (164). On the ophthalmic ganglion.
 JESSOP (169). On the anatomy and histology of the internal muscles of the eye in Mammals.
 ONODI (280). On the development of the sympathetic nervous system.
 OSBORN (281). On the origin and homologies of the corpus callosum.
 TAFANI (363). Researches on the anatomy of the ear.
 VITI (386). On the anatomy of the depressor nerve in Mammals.

(d.) *General Anatomy of the Soft Parts.*

- ALBRECHT (2), (7), and (8). On the morphological signification of hare-lip.
 BOULART & PILLIET (50) and (51). On the anatomy of the tongue.
 DUBOIS (106). On the anatomy of the larynx in Vertebrates.
 GEGENBAUR (132). On the structure of the "sublingua" in Lemurs and other Mammals.
 GRUBER (139). On the muscle known as the extensor digiti indicis proprius in Mammals.
 RETTERER (312). On the tonsils in Mammals.
 WALDEYER (387). On the anatomy of the pharynx and larynx.

(e.) *Structures connected with the Reproductive Organs.*

- ALBRECHT (1) and (3). On the homology of the Mammalian penis with the Selachian clasper.
 LAULANIÉ (198). On the homologies of the seminal tubules in the ♀.
 PILLIET (292). On the muscular coats of the Mammalian oviducts.

2. EMBRYOLOGY.

(a.) *Fœtal Membranes.*

- COLLUCCI (73). On the structure of the placenta.
 LAULANIÉ (199). On the structure of the placenta.
 — (195) and (197). On the stroma of the maternal placenta of Rodents.
 RYDER (322). On the formation of the amnion.

(b.) *Development of Special Groups.*

- SELENKA (342). On the development of Marsupials.
 PARKER (286). On the development of the skull in the *Edentata* and *Insectivora*.

(c.) *Development of Skeleton.*

BONNET (46). Refutation of Albrecht's discovery of the notochord in the nasal septum of the Cow.

FRORIEP (129). On the development of the vertebral column in Mammals.

(d.) *Development of Nerves and Sense Organs.*

GOTTSCHAU (135). On the development of the lens of the Mammalian Eye.

KORANYI (180). On the development of the Vertebrate lens.

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(e.) *Development of other Organs.*

FLEMMING (122). On the origin of the nephridial epithelium from the epiblast.

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STRAHL (357). On the formation of the cloaca in the Dog embryo.

3. HISTOLOGY.

BAGINSKY (24). On the histology of the cochlea.

CUCCATI (86). On the histology of the retina.

DOSTOIEWSKY (104). On the histology of the supra-renal body.

— (103). On the histology of the pituitary body.

— (105). On the histological structure of the ciliary body and of the iris.

JENSEN (165) and BALLOWITZ (29). On the structure of the Mammalian spermatozoa.

LAULANIÉ (196). On the histology of the ovarian follicle.

LILIENBERG (210). Histology of connective tissue.

LOTHRINGER (212). On the histology of the Mammalian hypophysis cerebri.

ROSENBERG (319). On nerve-end-organs in the tongue of Mammals.

SCHIEFFERDECKER (329). On the structure and arrangement of the supporting cells of the retina.

4. CATALOGUES OF MUSEUMS AND COLLECTIONS.

JAMES (163). Catalogue of Mammals in the collection of the Cincinnati Society of Natural History.

LYDEKKER (216). Third part of the Catalogue of the Fossil Mammals in the British Museum.

— (217). Catalogue of the Siwalik *Mammalia* in the Indian Museum.

— (218). Catalogue of the Indian Pleistocene *Vertebrata* in the Indian Museum.

NEHRING (254). Catalogue of the Agricultural School-Museum in Berlin.

STERNDAL & AITKEN (355). Catalogue of the Museum of the Bombay Natural History Society.

5. MISCELLANEOUS.

ALBRECHT (4). On the relation of the *Cetacea* to the *Promammalia*.

— (6). On hyperdactylism, true and false.

CHABRY (65). On the dynamical problems involved in springing animals.

CONWENTZ (74). On the hybernating *Mammalia* in the neighbourhood of Danzig.

CORNÉLY (84). List of the animals that have bred in the author's Park at Tours.

CUNNINGHAM (88). On the lumbar curve of Men and Apes.

DAVIES (92). On Mammals found in bone caves.

HUET (161). On the actual size of the primitive bundles of the muscles in various Mammals.

NEHRING (267). On the origin of domestic animals.

NOTT (278). A popular account of wild animals, illustrated by photographic reproductions.

SUTTON (362). On specimens of disease in Mammals.

— (361). On atavism.

THOMAS (368), p. 76. On erythrism in Squirrels.

WILCKENS (398). On the causes of the sex of animals.

6. GEOGRAPHICAL DISTRIBUTION AND FAUNÆ.

(a.) *General Works.*

HAACKE (145). On the North Pole as a centre of distribution for land animals.

REICHENOW (309). On geographical distribution.

WILLS (391). Notes on the fauna of Brazil.

(b.) *Distribution of Extinct Forms.*

AMEGHINO (18). On the tertiary fossil Mammals of the Argentine, with descriptions of many new species.

BALL (28). On the fossil Mammalian fauna of Ireland.

COPE (80). Fossil Mammals of Brazil.

COPE (83). On the fossil Mammals of the valley of Mexico.

— (82). Fossil Mammals from Swift Current Creek, North West Territories, Canada.

DEPERET (97). Fossil Mammals of the Pliocene beds of Roussillon, in France.

— (98). Fossil Mammals of the Miocene beds of Cerdagne.

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Eschatius longirostris, n. sp., COPE (83), fossil from the Valley of Mexico.

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Bachitherium. FILHOL (117) on its dentition. *B. insigne*: FILHOL (115) on remains from Quercy phosphate bed.

Protomeryx suevicus, n. g. & sp., SCHLOSSER, (330) p. 96, from the Bohnerzen, near Ulm.

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Cryptomeryx, n. g., SCHLOSSER (330), made for the reception of *Lophiomeryx gaudryi* of Filhol, and for *Cryptomeryx major*, n. sp., p. 94.

CÆNOTHERIIDÆ.

Spaniotherium speciosum, n. sp., FILHOL, (115) p. 35, from the Quercy phosphates.

ANOPLOTHERIIDÆ.

Xiphodon magnum, n. sp., FILHOL, (115) p. 40, from the Quercy phosphates.

Phaneromeryx, n. g., SCHLOSSER (330), made for the reception of *Xiphodon gelyense* of Gervais, p. 95.

Oxacron minimus, n. g. & sp., FILHOL, (115) p. 34, from the Quercy phosphates [also described in paper quoted in Zool. Rec. xxi, *Mamm.*, (109).]

Plesidacrytherium elegans, n. g. & sp., FILHOL, (115) p. 33, from the Quercy phosphates.

✓ *Adrotherium depressum*, n. g. & sp., FILHOL, (115) p. 31, from the Quercy phosphates.

OREODONTIDÆ.

Merycochærus obliquidens, n. sp., COPE, (81) p. 359, from Cottonwood Creek, Oregon.

SUIDÆ.

Sus domesticus : SCHMIDT (335) on variations and atavism in a litter of Pigs. *S. longirostris* : NEHRING (261) on its skull. *S. niger*, n. sp., FINSCH (119), from New Guinea. *S. major* : DEPÉRET & REVOLLE (98), from the Upper Miocene of Cerdagne.

Euryodon maximus, n. g. & sp., LEIDY (205), fossil from Florida.

Doliocherus quercyi. FILHOL (115) on the skull and dentition.

Haplomeryx zitteli, n. sp., SCHLOSSER, (330) p. 96.

HIPPOPOTAMIDÆ.

Hippopotamus. WOODWARD (406) on the various species of the genus, recent and extinct. *H. amphibius* : WEBER (390) on certain points in the anatomy ; SIGEL (346), notes on its external anatomy ; PILLIET & BOULART (293) on its stomach.

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TAPIRIDÆ.

Tapirus arvernensis. PANTANELLI (285), description of fossil remains from Spoleto.

LOPHIODONTIDÆ.

Lophiodon. FILHOL (118), description of an almost complete skeleton from the Middle Eocene of Issel.

Hyracotherium (*Orohippus*). SCOTT (341) on the pitted incisors of these forms. *H. quercyi*, n. sp., FILHOL, (115) p. 30, from the Quercy phosphates.

Tapirulus hyracinus : FILHOL (115) on the dentition of the upper jaw ; FILHOL (116) on its lower-jaw dentition.

MENODONTIDÆ.

Menodus angustigenis, n. sp., COPE (82), from the Oligocene Beds of the Swift Current Creek Region.

PALÆOTHERIIDÆ.

Anchitherium (*Miohippus*). SCOTT (341) on the pitted incisors of these forms. *A. ultimum*, n. sp., COPE, (81) p. 357, from the Tricholeptus beds, Cottonwood Creek, Oregon.

EQUIDÆ.

Hipparion gracile, DEPÉRET & REVOLLE (98), from the Upper Miocene of Cerdagne.

Hippotherium rectidens, n. sp., COPE, (81) p. 360, from the Loup Fork, Upper Miocene of Tehuichila, State of Vera Cruz, Mexico.

Equus caballus: CUYER & ALIX (89) and LEISERING (207), textbook on the Horse; NÖRNER (277) on the anatomy and histology of the Horse's hoof. *E. burchelli*: LANGKAVEL (187) on the distribution of the Zebra and allied forms. *E. hemionus*: SCHÄFF (328), description of a young foal.

RHINOCEROTIDÆ.

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Rhinoceros sinus and *R. bicornis*: SCLATER (336) on the external points of difference between these two species. *R. lasiotis*: NOAK (275), notes on the external anatomy. *R. tichorhinus*: NADAILLAC (252) on its discovery at Spy, in Belgium.

Aceratherium minus. FILHOL (115) on the lower jaw found in the Quercy phosphates.

MACRAUCHENIIDÆ.

Scalabrinitherium bravardi and *rothii*. AMEGHINO, (18) p. 110, description of these forms from Tertiary deposits of the Argentine.

CHALICOTHERIIDÆ.

Chalicotherium baltavarensis, n. sp., PETHÖ (294), from the Baltavár beds.

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TOXODONTIDÆ.

Toxodon expansidens, n. sp., COPE, (80) p. 20, from the Pampean Pliocene of the province of Bahia, Brazil. *T. burmeisteri*: LEIDY (206), note on remains of this form from Nicaragua, C. A. *T. virgatus*, n. sp., AMEGHINO, (18) p. 91, from the Argentine Tertiaries.

Stenotephanus, n. g., AMEGHINO, (18) p. 104, for type *Toxodon plicidens* of same author.

Dibolodon lutarius, n. sp., AMEGHINO, (18) p. 108, from the Argentine Tertiaries.

Haplodontherium limon, n. sp., AMEGHINO, (18) p. 102, from the Argentine Tertiaries.

Neosodon. MOUSSAYE (250), note on.

TYPOTHERIIDÆ.

Tomodus elautus, n. g. & sp., AMEGHINO, (18) p. 109, from the Argentine Tertiaries.

CONDYLARTHRA.

PHENACODONTIDÆ.

Phenacodus. WOODWARD (405), an account of this primitive Perissodactyle type.

AMBLYPODA.

Elachoceras parvum, n. g. & sp., SCOTT (340), from the Bridger Beds of Henry's Fork, Wyoming, U.S.A.

DINOCERATA.

Uintatherium alticeps, n. sp., SCOTT (340), from the Bridger Beds of Wyoming, U.S.A.

Tetheopsis. COPE (75), note to the effect that this genus has no real existence.

8. *SIRENIA*.

CAPELLINI (63). On fossil Sirenians from Sardinia.

HALITHERIIDÆ.

Halitherium schinzi. FLOT (123), note on its hind limb.

Metazytherium lovisati, n. sp., CAPELLINI (62), fossil from Sardinia.

Felsinotherium subapenninum and *gustaldii*. PORTIS (299), notes on these forms.

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Rhytina stelleri. ROUX (320) on a canal system in its bones due to a fungus (*Mycelites*).

MANATIDÆ.

Manatus. HARTLAUB (149) distinguishes three species: *M. senegalensis*, *inunguis*, and *latirostris*.

Manatherium delheidi, n. g. & sp., HARTLAUB (150), from Oligocene of Hoboken, Belgium.

9. *CETACEA*.

ALBRECHT (4). On the relation of the *Cetacea* to the *Promammalia*.

BENEDEN (40). On the Whales and Dolphins of the coasts of Europe.

CAPELLINI (63). On fossil Whales from Sardinia.

JOUAN (171). Notes on Whales stranded on the coasts of France at different times.

PORTIS (299). On the fossil *Cetacea* of Italy.

POUCHET & BEAUREGARD (300), on the development of the spermaceti organ ; (301), on the development of whalebone.

PROBST (303). On the fossil Cetaceans found in the Baltringen beds near Laupheim.

SOUTHWELL (348) and COCKS (69). On the Whale fishery in 1885.

WEBER (390). On the anatomy and phylogeny of the *Cetacea*.

BALENIDÆ.

Balæna biscayensis. BENEDEN (39), monograph on this species of Whale ; NEWTON (272), on its occurrence in the Norfolk Forest-bed.

Balænoptera borealis : COLLETT (71) on its external features and habits. *B. musculus* : WILSON (400), measurements, photograph, and external characters. *B. sibbaldii* : SMETS (347), on the development of the skull. *B. rostrata*, *borealis*, *musculus*, and *sibbaldii* : GUILDING (142), notes on their breeding habits. *B. musculus* and *rostrata* : BEAUREGARD (35) and (36), notes on captured specimens. *B. musculus* and *borealis* : STRUTHERS (358), notes and measurements. *B. gastaldi*, *cortesii*, and 4 new unnamed species, p. 310 : PORTIS (299), notes on fossil remains of these species. Su

Cetotherium rathkei. BENEDEN (41), description of remains from Caucasus.

Megaptera sp. : BEAUREGARD (37), note on captured specimen. *M. longimana* : STRUTHERS (358), notes and measurements. *M. boops* : GUILDING (142), on its breeding habits.

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Physeter macrocephalus. NEWTON (272) on its occurrence in the Norfolk Forest-bed.

Hyperoodon rostratus. TURNER (385) on its occurrence in British Seas, and on its external anatomy and dentition.

Mesoplodon bidens : SOUTHWELL & CLARKE (349) on the occurrence of this species on the Yorkshire coast ; AURIVILIUS (21) on the external characters and osteology of this rare Whale.

Hoplocetus crassidens : PROBST (303), description of remains from Baltringen. *H. minor*, n. sp., PORTIS, (299) p. 321, from the marine Pliocene of Andona.

Physotherium solterii, n. g. & sp., PORTIS, (299) p. 325, from the marine Pliocene of Andona.

Priscophyseter typus, n. g. & sp., PORTIS, (299) p. 315, from Pliocene Beds of Astigiana.

Physodon leccense. PROBST (303), description of remains from Baltringen.

Ziphioides triangulus, n. sp., *Z. obliquus*, n. sp., PROBST (303), fossil from Baltringen.

Berardiopsis pliocenæus, n. g. & sp., PORTIS, (299) p. 326, from the Valley of Astigiana.

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Chamsodelphis italicus, n. sp., PORTIS, (299) p. 334, from the Upper Miocene Beds, near Casal-Monferrato. *C. denticulatus*, n. sp., *C. cristatus*, n. sp., PROBST (303), fossil from Baltringen.

Squalodon gastaldii. PORTIS, (299) p. 329, notes on this fossil form.

Schizodelphis compressus, n. sp., PORTIS, (299) p. 337, fossil from beds near Neive.

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Phocaena communis: MACKAY (225) on the arteries of the head and neck, and on the retina mirabile; MATTHIESSEN (228) on its eye. *P. orca*: LEYDIG (209), its occurrence in the Rhine 200 years ago; KERVILLE (175), notes and measurements.

Tursiops cortesii: PORTIS (299), from Pliocene of Mombercelli. *T. miocænus*, n. sp., PORTIS, (299) p. 344, fossil from Rosignano.

Grampus griseus. BALKWILL (26), notes on a specimen captured near Eddystone.

Prodelphinus doris. TRUE (379) on the characters, external and osteological, of this species.

Steno gastaldii: PORTIS (299), notes on this species from Calunga, in Piedmont. *S. bellardii*, n. sp., from Asti, near Bagnasco.

10. EDENTATA.

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BRADYPODIDÆ.

Bradypus tridactylus. PILLIET & BOULART (293) on its stomach.

MAGATHERIIDÆ.

Nephoterium, n. g., AMEGHINO, (18) p. 180, for type *Myloodon ambiguus* of the same author.

Promegatherium remulsun, n. sp., AMEGHINO, (18) p. 175, from the Tertiary of the Argentine.

Pseudolestodon æqualis, n. sp., AMEGHINO, (18) p. 184, from the Argentine Tertiaries.

Scelidotherium leptcephalum, *S. bravardi*, n. sp., and *S. chiliensis*, n. sp., LYDEKKER (219), the former described by Owen, the latter two new; all fossil from the Argentine Republic. *S. bellulum*, n. sp., AMEGHINO, (18) p. 179, from the Argentine Tertiaries.

Orocanthus and *Cælodon*. AMEGHINO (17) and (19), BURMEISTER (54) and (55), and LÜTKEN (215), all contributions to a controversy as to the generic identity of these two genera, which is asserted by Burmeister and denied by the other two authors.

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Tatusia pilosa: FLOWER (124) on this rare species. *T. hybrida*: IHERING (162A), observations on its development.

Chlamydotherium? *extremum*, n. sp., AMEGHINO, (18) p. 205, from the Argentine Tertiaries.

Proeuphractus limpidus, n. g. & sp., AMEGHINO, (18) p. 206, from the Argentine Tertiaries.

GLYPTODONTIDÆ.

Caryoderma suovianum, n. g. & sp., COPE (79), from the Loup Fork Bed of Kansas.

Comaphorus concisus, n. g. & sp., AMEGHINO, (18) p. 195, from the Argentine Tertiaries.

11. MARSUPIALIA.

SELENKA (342) on the development of Marsupials.

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Phascolomys curvirostris. OWEN (283), description of the premaxilla.

PHALANGISTIDÆ.

Petaurista taquanoides. HASWELL (152) on its myology.

MACROPODIDÆ.

Halmaturus bennettii. PILLIET & BOULART (293) on its stomach

Lagostrophus fasciatus, n. g., THOMAS (370) proposes this new genus for the Wallaby, hitherto known as *Lagorchestes fasciatus*.

DASYURIDÆ.

Dasyurus viverrinus. MACCORMICK (224) on the myology of its limbs.

Phascogale virginiae: COLLETT (72), redescription of this rare form, the type of which has been lost, pl. lx. *P. flaviceps*: SACK (323) shows that the crura penis spring from the ischium in this form. *P. doriae*, n. sp., THOMAS (372B), from Mt. Arfak, New Guinea.

DIDELPHYIDÆ.

Didelphys virginiana. SELENKA (342) on its development.

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Neoplagiulax molestus, n. sp., COPE (76), from Puerco Beds.

AMPHITHERIIDÆ.

Dromatherium sylvestre. OSBORN (282), redescription of this form.

Microconodon tenuirostris, n. g. & sp., OSBORN (282), founded on a specimen from the Chatham coal fields (Upper Trias), described by Emmons as *Dromatherium sylvestre*.

12. MONOTREMATA.

GEGENBAUR (131). On the mammary glands of Monotremes.

ECHIDNIDÆ.

Echidna. LENDENFELD (208) on the temperature of the brood-pouch ; HAACKE (144) shows that the young *Echidna*, after being hatched, still remains in the brood-pouch.

ORNITHORHYNCHIDÆ.

Ornithorhynchus paradoxus. WESTLING (393) on its peripheral nervous system, and on other points in its anatomy.

A V E S.

BY

A. H. EVANS, M.A., F.Z.S.

THE year 1886 is perhaps chiefly noticeable, from an ornithological point of view, for the large number of papers on Anatomy, Morphology, Physiology, and Pathology. Excellent work in these subjects has been done by Beddard, Gadow, and Shufeldt; Canfield, Meves (two papers on the eye), Goodchild, Kerschner, Klee, Lwoff (three papers on the feathers, &c.), and Sclater; Cazin, Dareste, Gerlach, Halliburton, McAlldowie, Nathusius, and Rochas; Dowdeswell, Leniez, and Sutton. Sundevall's work on the Wings of Birds has also been translated into English. Many important works have advanced a stage—noticeably those of Godman & Salvin (*Biologia Centrali-Americana*), Booth (*Rough Notes on the Birds of the British Islands*), Giglioli and Manzella (*Iconografia dell' Avifauna Italica*), Lord Lilford (*Coloured Figures of the Birds of the British Islands*), Gould [Sharpe] (*Birds of New Guinea*), Meyer (*Abbildungen von Vogel-skeletten*),—while Dresser's *Monograph of the Meropidae* and Taczanowski's *Ornithologie du Pérou* are concluded. Sclater continues the *Catalogue of the Birds of the British Museum* with vol. xi., treating of the Families *Carebidae*, *Tanagridae*, and *Icteridae*. Of new publications the chief are those of Cory (*Birds of the West Indies*) and Reyes y Prosper (*Birds of Spain, Portugal, and the Balearic Islands*), which supplies a want much felt by ornithologists; while Capen (*Oology of New England*) and Jones (*Birds of Ohio*) add to our libraries two useful works on the Eggs and Nests of American Birds, with excellent plates. The continuation also of Sundman's *Finnische Vögeleier*, under the name of *Finska Fogelägg*, is a welcome addition to the same subject. Important papers on extinct species are contributed by Haast, Newton [E. T.], and Owen, while the articles on Birds in the *Encyclopædia Britannica* by Newton [A.] are, if possible, of greater interest than usual. Mention should be made, in conclusion, of the travels and explorations of Guillemard, Hartert, Johnston, and Radde.

The chief works published during the past year, so far as they relate to GEOGRAPHICAL AREAS, &c., may be found under the names below, while reference should also be made to Berlepsch, Gadow [Bronn], Collett,

Dresser, Finsch & Meyer, Gurney [J. H.], Hargitt, Newton [A.], Payne-Gallwey, Pelzeln & Lorenz, Reichenow, Schalow, Sclater, Seebohm, Sharpe, Shelley, Shufeldt, Stejneger, Tristram, and Vian.

PALÆARCTIC REGION : Bianchi (Pamir and Alai), Blakiston (Japan), Fischer & Pelzeln (Jan Mayen), Gätke (Heligoland), Giglioli (Italy), Guillemard (Japan and Kamtschatka), Gurney [J. H., Jun.] (Britain), Hartwig (Madeira), Lilford (Britain), Lütken (Denmark), Macpherson (Britain), Meves (Russia), Menzbier (Russia), Middendorf & Seidel (Russia), Mojsisovics (Hungary and Slavonia), Olphe-Galliard (W. Europe), Pelzeln & Lorenz (Japan), Pleske (Russian Lapland), Reyes y Prosper (Spain, Portugal, and Balearic Is.), Slater & Carter (Iceland), Stejneger (Japan), Sundman (Finland), Taczanowski (Ussuria), Tschusi (Austro-Hungary).

ETHIOPIAN : Ayres [Gurney, J. H.] (Transvaal), Hartert. (Niger), Hartlaub (Tanganyika), Johuston (Kilima-njaro), Oustalet (Congo and Somaliland), Schalow (Tanganyika), Sharpe (Muscat, Aden), Shelley (*Ploceidæ* of the region), Sousa (E. Africa, Angola), Yerbury (Aden).

INDIAN : Blasius (Celebes), Bourne (Diego Garcia), Büttikofer (Tenimber Is.), Grabowsky (Borneo), Nikolskago (Persia and Transcaspia), Oustalet (China), Parker [H.] (Ceylon), Radde (Transcaspia), Ramsey [R. G. W.] (Philippines), Saunders (Diego Garcia), Sharpe (Persia, Attock, Perak, &c.), Vorderman (Java), Zaroudnoi (Transcaspia).

AUSTRALIAN : Finsch & Meyer (New Guinea), Gould [Sharpe] (New Guinea), Guillemard (New Guinea), Meyer (New Guinea), Potts (New Zealand), Reischek (New Zealand), Salvadori (New Guinea, Moluccas, Sulu Is.), Tristram (Pacific).

NEARCTIC : Allen (U.S.), Brewster (U.S.), Butler (U.S.), Capen (U.S.), Goss (U.S.), Henshaw (U.S.), Jones (U.S.), Ridgway (U.S.), Scott (U.S.), Seton (Canada).

NEOTROPICAL : Berlepsch (U.S. Colombia), Cory (West Indies), Ferrari-Perez (Mexico), Godman & Salvin (Cent. America), Lawrence (Yucatan, Guadeloupe), Ridgway (Venezuela, Mexico, Guatemala), Salvin (Guiana), Sclater (Peru, Chili), Taczanowski (Peru), Wells [J. G.] (Grenada).

For extinct species see : Haast, Lydekker, Moseley, Nathusius, Newton [E. T.], Owen, Smith [W. W.], White, Woodward.

For anatomical, morphological, physiological, and pathological papers, see : Altum, Bayer, Beddard, Bemmelen, Bert, Bergonzini, Boccardi, Boulart, Bräss, Canfield, Cattaneo, Cazin, Charbonnel-Sallé, Chatin, Cowper, Cretté de Palluel, Dareste, Dogiel, Dowdeswell, Edwards, Gadow [Bronn], Gerlach, Goodchild, Halliburton, Helm, Herrick, Kerschner, Klee, Laulanié, Leniez, Lunel, Lwoff, Magnien, Matthiessen, Marey, McAlldowie, Meves, Meyer, Müllenhoff, Nathusius, Nocard, Phisalix, Raon, Retterer, Rochas, Romiti, Sclater, Shufeldt, Sundevall, Sutton, Trouessart, Warynski, Wijhe.

Catalogue of Eggs. *T. c.* pp. 21 & 22.

ix. Jahresbericht (1884) des Ausschusses für Beobachtungsstationen der Vögel Deutschlands. *J. f. O.* 1886, pp. 129-387. [*Cf. Zool. Rec.* xxii, *Aves*, p. 2.]

Errata in VIII Jahresbericht. *E. Ziemer, t. c.* pp. 387 & 388.

Notices of presentations of collections to the British Museum by A. O. Hume and by F. D. Godman & O. Salvin, &c. *Ibis*, 1886, pp. 529-531.

Report on the Migration of Birds in the Spring and Autumn of 1885. By J. A. Harvie-Brown, J. Cordeaux, R. M. Barrington, A. G. More, & W. Eagle Clarke. Seventh Report. Edinburgh: 1886, 8vo, 173 pp.; Heligoland is included.

The Code of Nomenclature and Check-List of North-American Birds, adopted by the American Ornithologists' Union: being the Report of the Committee of the Union on Classification and Nomenclature. New York: 1886, 8vo, viii & 392 pp.

AITKEN, E. H. [See *Phyllornis jerdoni* (*Pycnonotidae*).]

— & STERNDALÉ, R. A. Catalogue of Birds and Eggs in the Collection of the Bombay N. H. Society. *J. Bomb. Soc.* 1886, pp. 14-22.

ALBARDA, H. 1. ornithologischer Jahresbericht (1885) aus Holland (Friesland und Zuid-Holland). *Ornis*, 1885, pp. 589-631.

ALLEN, J. A. A Revised List of the Birds of Massachusetts. *Bull. Am. Mus. N. H.* i, pp. 221-271. [*Cf. Zool. Rec.* xv, *Aves*, p. 2.]

22 additions are made to the former list. The divisions used are—fully authenticated, extirpated, probable, doubtful, and introduced species [340, 4, 19, 3, 4 resp.].

— The present Wholesale Destruction of Bird Life in the United States. *Science*, 1886, pp. 191-195.

Several smaller papers follow on much the same subject.

— [See also *Colinus* (*Phasianidae*).]

ALLÉON, A. Mémoire sur les oiseaux observés dans la Dobrodja et la Bulgarie. *Ornis*, 1886, pp. 397-428.

ALTUM, E. Zur "Vergiftung" der Finken durch Mennige. *J. f. O.* 1886, pp. 77-81.

ANGUS, W. C. [See *Tetrao* (*Tetraonidae*).]

ANTHONY, A. W. Field Notes on the Birds of Washington Co., Oregon. *Auk*, iii, pp. 161-172.

120 species and subspecies.

ARMISTEAD, J. J. Notes on Birds of the Solway District. *Naturalist*, 1886, pp. 69-78. [Conclusion.]

ASHWORTH, J. R. [See *Emberiza* (*Fringillidae*).]

1886. [VOL. XXIII.]

AUBUSSON, L. M. D'. Catalogue raisonné par régions des espèces d'Oiseaux qu'il y aurait lieu d'acclimater et domestiquer en France. Bull. Soc. Acclim. 1886, pp. 1-29, 244-261, 417-429, & 573-586, cuts. [*Phasianide, Tetraonide.*]

AYRES, T. Additional Notes on the Ornithology of Transvaal. Communicated by J. H. GURNEY. Ibis, 1886, pp. 282-298.
[See *Ardetta* (*Ardeide*).]

BABINGTON, CHURCHILL. Catalogue of the Birds of Suffolk; with an introduction and remarks on their distribution. Part II., concluding the work, pp. 111-281, pls. i-vii. [*Cf. Zool. Rec. xxi, Aves, p. 3.*]

BARNES, H. E. Birds' Nesting in Rajpootana. J. Bomb. Soc. 1886, pp. 38-62.

BATCHELDER, C. F. The North Carolina Mountains in Winter. Auk, iii, pp. 307-314.

Recording 40 species.

BAYER, F. O korakoidech ptáků. SB. böhm. Ges. 1885, pp. 254-269, pls. i & ii. [A short résumé is given in German.]

On the coracoid of Birds.

*BEAUREGARD, H. Zoologie générale. Paris: 1885, 188 pp.

BECHER, E. F. A Sind Lake [Manchar]. Zool. 1886, pp. 425-431.

The notes include *Passer pyrrhonotus*.

BECKHAM, C. W. [See *Regulus* (*Sylviide*).]

BEDDARD, F. E. Note on the Air-sacs of the Cassowary. P. Z. S. 1886, pp. 145 & 146.

The author finds that the hitherto undescribed respiratory organs of *Casuaris* resemble those of *Apteryx* rather than those of *Rhea*, the differences consisting in the position and slope of the dissepiments, and in the shape and size of the air-sacs, &c. The conclusions he draws are that *Casuaris* is near *Apteryx*, and that *Dromæus* should be separated from the former, and placed nearer *Rhea* and *Struthio*.

— On the Syrinx and other Points in the Anatomy of the *Caprimulgide*. T. c. pp. 147-153, 3 cuts.

The author begins by stating that *Steatornis* is a most remarkable genus, and is parallel, with regard to its bronchial syrinx, to *Orotophaga* (*Cuculide*), though differing in certain details. He says that in the *Caprimulgide* the variation of structure of the syrinx is parallel to that of *Cuculide*, and that, as in the latter [*cf. Zool. Rec. xxii, Aves, p. 50*], the family may be divided into 3 types—(i.) *Caprimulgus*, *Chordeiles*, *Nyctidromus*, *Egotheles* (where the syrinx is tracheo-bronchial); (ii.) *Batrachostomus*, *Podargus* (where it is intermediate between the above and *Steatornis*, though nearer the latter); (iii.) *Steatornis* (where it is purely bronchial). He passes over *Caprimulgus* and *Chordeiles*, as being already known, and describes the syrinx in the other five genera (cuts of first 3). Remarks follow on the visceral anatomy [*e.g., Egotheles* differs in having no cœca, *Chordeiles* in having no gall-bladder], and on the Myology

where the genera appear more aberrant. The deductions agree with the above triple division, or perhaps *Ægotheles* may be considered the type of a fourth subfamily.

[BEDDARD, F. E.] On some Points in the Anatomy of *Chauna chavaria*. *T. c.* pp. 178-181, pl.

The writer's main object is to supply details of the anatomy of the genus, omitted by Garrod in his description of *Chauna derbiana*. The air-sacs, &c., show a relationship to the Storks and Cranes; the alimentary canal differs slightly from that of *C. derbiana*, as do the extrinsic muscles of the syrinx, but not the syrinx itself.

— Notes on the Convoluted Trachea of a Curassow (*Nothocrax urumutum*), and on the Syrinx in certain Storks. *T. c.* pp. 321-325, 3 cuts.

The Storks *Xenorhynchus* and *Abdimia* have a syrinx intermediate between that of the *Ardeidæ* and *Ciconiidæ*. They also correspond to the *Ardeidæ* in the want of an *ambiens* muscle [*fide* Garrod].

°BĚLOHLÁVEK, F. Ornithologické pomery Párdubicka. Progr. ob Realsch. Pardubitz (1885), 8vo, 36 pp. [also separate, 38 pp.].

Notes on the ornithology of Pardubitz and the neighbourhood (Austro-Hungary).

BEMMELEN, J. F. v. Die Visceralsaschen und Aortenbogen bei Reptilien und Vögeln. *Zool. Anz.* 1886, pp. 528-532 & 543-546.

°BENSON, C. W. Our Irish Song Birds. Dublin: 1886, post 8vo, 189 pp.

BĖRGONZINI, C. Sulla struttura dello Stomaco dell' *Alcedo ispada* e sullo strato cuticolare (corneo) del ventricolo degli uccelli. *Atti Soc. Mod. Mem. (Rendic.)* 1886, pp. 94 & 95; *cf. t. c.* 1885, pp. 1-13, cuts. [See CATTANEO, G.]

BERLEPSCH, H. v. On some Interesting Additions to the Avifauna of Bucaramanga, U. S. of Colombia. *Ibis*, 1886, pp. 53-57, pl. iv.

[See *Xenerpestes minlosi*, nn. sp. & g. (*Dendrocolaptidæ*), *Oncostoma (Tyrannidæ)*.] [*Cf. Zool. Rec.* xxi, *Aves*, p. 4.]

°— Kritische Bemerkungen zur Colibri-Literatur. *Festschr. Ver. Nat. Cassel*, 1886.

°BERT, P. Sur le rôle de la membrane nictitante des oiseaux. *C.R. Soc. Biol.* 1885, p. 532.

BIANCHI, V. Zur Ornithologie der westlichen Ausläufer des Pamir und des Alai. *Bull. Pétersb.* xxxi, pp. 337-396.

A list of 136 species, founded on a collection from the East of Bokhara, 8 of which were not found by Severtzoff, but none of which are new.

— [See also *Otomela bogdanowi*, n. sp. (*Laniidæ*).]

BIDWELL, E. A Visit to the Isles of Scilly during the Nesting Season. *Tr. Norw. Soc.* 1886, pp. 201-214.

Account of the nesting of Greater Black-backed Gull and Manx Shearwater, notes on local names, &c.

BLAKISTON, T. W. Water Birds of Japan. P. U. S. Nat. Mus. 1886, pp. 652-656.

Gives tables of distribution of the above, and of Sea Birds peculiar to the North Pacific.

BLANFORD, W. T. A Criticism of the Views of H. Seebohm, on the Effect of the Glacial Epoch, &c. on the *Charadriidae* and other Birds. *Ibis*, 1886, pp. 525-528.

BLASIUS, R., & HAYEK, G. V. II. Bericht über das permanente internationale ornithologische Comité und ähnliche Einrichtungen in einzelnen Ländern. *Ornis*, 1886, pp. 1-48.

BLASIUS, W. Beiträge zur Kenntniss der Vogelfauna von Celebes. II. Vögel von Nord-Celebes, 1866 und 1867 gesammelt in der Minahassa und 1868, dem Herzoglichen Naturhistorischen Museum in Braunschweig geschenkt von Herrn Resident J. G. F. Riedel, damals in Gorontalo. *Z. ges. Orn.* 1886, pp. 81-179. III. Vögel von Nord-Celebes, gesammelt in der Minahassa und zu verschiedenen Zeiten (hauptsächlich 1869 und 1876) dem Zoologischen Museum der Kaiserlichen Akademie der Wissenschaften zu St. Petersburg geschenkt [von demselben]. *T. c.* pp. 193-210. [*Cf.* *Zool. Rec.* xxii, *Aves*, p. 4.]

These two papers contain a long and elaborate account of the above collections [82 and 15 species], including differences observed in the individual colouring and measurements, remarks on the synonymy, and opinions of authors, as well as important specific distinctions. Finally, a list is given of 78 species sent by Herr Riedel to the St. Petersburg Museum. [See also *Lalage* (*Campophagidae*), *Hirundo* (*Hirundinidae*), *Sturnia* (*Sturnidae*), *Acrocephalus* (*Sylviidae*), *Monticola* (*Turdidae*), *Eudynamis* (*Cuculidae*), *Lorius* (*Psittaci*), *Butorides* (*Falconidae*), *Microcarbo* (*Phalacrocoracidae*), *Plotus* (*Plotidae*), *Nettapus* (*Anatidae*), *Chalcophaps*, *Macropygia*, *Osmotreron* (*Columbidae*), *Porphyrio* (*Rallidae*), *Aegialitis*, *Charadrius* (*Charadriidae*), *Terekia*; *Numenius* (*Scolopacidae*), *Hydrochelidon* (*Laridae*).]

— [See also *Dicaeum nehrkorni* (*Dicaeidae*), *Rallus plateni* (*Rallidae*), n. spp.]

BLIGH, S. [See *Lophotriorchis* (*Falconidae*).]

BOCCARDI, G. Ricerche sul lo sviluppo dei corpuscoli del sangue negli uccelli. *Rend. Acc. Nap.* xxv, pp. 58-64, cut.

Method of research, as well as microscopic observations.

BOGDANOW, M. [See *Phasianus komarowii*, n. sp. (*Phasianidae*).]

BÖHM, R. [the late]. [See SCHALOW, H.]

BOOTH, E. T. Rough Notes on the Birds Observed during Twenty Years' Shooting and Collecting in the British Islands. London: 1886, folio, pts. x, xi, xii, & xiii, discontinuous pagination. [*Cf.* *Zool. Rec.* xxii, *Aves*, p. 5.]

Containing House Sparrow (2 pls.), Bullfinch, Redbreast, Black Grouse (pl.), Red Grouse (pl.), Spoonbill (pl.), Grey-lag Goose (pl.), White-

fronted Goose, Scoter (pl.), Smew (pl.), Slavonian Grebe, Little Grebe, Ring Ouzel, Rock Dove (pl.), White Stork, Turnstone, Spotted Redshank, Snipe (pl.), Curlew Sandpiper (pl.), Knot (pl. and map of Breydon mudflats), Scaup, Puffin (pl.), Razorbill, Cormorant, Roseate Tern (pl.), Arctic Tern, Little Gull (pl.), Siskin (pl.), Linnet, Lesser Redpoll, Mealy Redpoll, Stock Dove, Ringed Plover, Kentish Plover, Sanderling, Oyster-Catcher, Greenshank, Common Sandpiper (pl.), Bartailed Godwit, Little Stint (pl.), Temminck's Stint (2 pls.), Bean Goose, Mute Swan (map of Hickling Broad), Velvet Scoter, Eared Grebe, Black-throated Diver, Black Guillemot, Sandwich Tern (pl.), Manx Shearwater, Cuckoo (pl.), Hoopoe (pl.), Green Sandpiper, Golden Oriole (pl.), Pheasant, Capercaillie (pl.), Common Partridge, Red-legged Partridge, Stone-Curlew (pl.), Heron (pl.), Wood-Sandpiper, Gadwall (pl.), Pintail Duck, Garganey, Common Teal, Red-necked Grebe (2 pls.).

BORRAMEO, C. Osservazioni ed Appunti di Ornitologia. Atti Soc. Ital. xxix, pp. 299-322.

The author wishes to put an end to excessive differentiation of species, and to avoid the consequent synonymy.

BOULART, R. Note sur les sacs aériens cervicaux du Tantale. Bull. Soc. Z. Fr. 1885, p. 348.

BOURNE, G. C. General Observations on the Fauna of Diego Garcia, Chagos Group. P. Z. S. 1886, pp. 331-335. [See SAUNDERS, H.]

BRÄSS, M. Das Federkleid der Vögel. Monat. Schutzvogelw., 1886, pp. 206-213 & 223-228.

I. An article on the names, &c., of the different forms of feathers.
II. Description of the wing feathers.

— Hat der Vogel Zähne? T. c. pp. 41-45.

BREWSTER, W. An Ornithological Reconnaissance in Western North Carolina. Auk, iii, pp. 94-112 & 173-179. [See *Junco hyemalis carolinensis* (Fringillidæ), *Vireo solitarius alticola* (Vireonidæ), n. subsp.]

— Additions to the Avi-fauna of Texas. T. c. pp. 139 & 281.

— Bird Migration. Memoirs of the Nuttall Ornithological Club, No. 1. Part I. Observations on Nocturnal Bird Flights at the Lighthouse at Point Lepreaux, Bay of Fundy, New Brunswick. Part II. Facts and Theories respecting the General Subject of Bird Migration. Cambridge, Mass.: 1886, imp. 8vo, 22 pp.

— On the Nest and Eggs of Swainson's Warbler (*Helonæ swainsoni*). Ibis, 1886, pp. 4-11. [Reprinted from Forest and Stream, xxiv, p. 468, and Auk, 1885, p. 346.]

— Additional Notes on Peale's Petrel (*Æstrelata gularis*). Auk, iii, pp. 389-393.

[See also *Æstrelata scalaris*, n. sp. (Procellariidæ), *Helminthophila (Mniotiltidæ)*, *Sterna (Laridæ)*.]

BRONN, H. G. Klassen und Ordnungen des Thierreichs, wissenschaftlich dargestellt in Wort und Bild. Fortgesetzt von Dr. Hans Gadow in Cambridge. Sechster Band, iv. Abtheilung. Vögel: *Aves* (b. Muskeln der Extremitäten. c. Muskeln des Visceral-Skelets), 13, 14, 15 Lieferung, pp. 273-320, pls. xxiva, xxvi, xxvii, & xxx-xxxiii. Leipzig und Heidelberg: 1886, 8vo. [Cf. Zool. Rec. xxii, *Aves*, p. 5.]

BROOKS, W. E. Additional Notes on the Genus *Acanthis*. Ibis, 1886, pp. 359-364.

BROWN, H. [See *Colinus (Phasianidae)*.]

BROWNE, M. Notes on the Vertebrate Animals of Leicestershire. Zool. 1886, pp. 16-24, 159-167, 193-202, 233-238, 326-331, & 409-415. [Cf. Zool. Rec. xxii, *Aves*, p. 6.]

BUNGE, A. Bericht über fernere Fahrten im Lena-Delta und die Ausgrabung eines angeblich vollständigen Mammuthcadavers. Aus Briefen an den Akademiker L. v. Schrenk. Mém. Biol. xii, pp. 231-309. [Cf. Zool. Rec. xxi, *Aves*, p. 8.]

There are hardly any notices of birds: *Anser albifrons*, *A. segetum*, *Harelda glacialis*, *Somateria spectabilis*, *Anas glochitans*, *Larus sabini*, *Tringa minuta*, *T. subarquata*, *Calidris arenaria*, *Charadrius squatarola*, *Lestrus pomatorhina*, *L. parasitica*, *L. buffoni*, *Nyctea nivea*, *Charadrius curonicus*, *Phalaropus rufescens*, *Sterna macrura*, *Larus argentatus*, *L. glaucus*, *Streptopelia interpres*, are mentioned (pp. 238 & 239).

BUTLER, A. W. A List of the Birds observed in Franklin County, Indiana. Bull. Brookville Soc. N. H. No. 2 [1886], pp. 12-39.

BÜTTIKOFER, J. On a Collection of Birds from the Tenimber Islands. Notes Leyd. Mus. viii. [1886], pp. 58-68, pl. iii.

31 species are given. [See *Erythromyias riedeli*, n. sp., *E. pyrrhota*, pls., (*Muscicapidae*), *Ardea* (*Ardeidae*), *Fregata* (*Fregatidae*).]

——. Zoological Researches in Liberia. A List of Birds collected by Mr. F. X. Stampfli near Monrovia, on the Messurado River, and on the Junk River, with its Tributaries. T. c. pp. 243-268.

126 species. [See *Sylvietta stampflii*, n. sp. (*Sylviidae*), *Cinnyris venustus*, *Cinnyris*, n. sp. ? (*Nectariniidae*), *Dryotriorchis* (*Falconidae*), *Francolinus* (*Phasianidae*).]

——. [See also *Pericrocotus lansbergii*, n. sp. (*Campophagidae*).]

CANFIELD, W. B. Vergleichend anatomische Studien über den Accommodationsapparat des Vogelauges. Arch. mikr. Anat. 1886, pp. 121-170, pls. xii-xiv.

After a general part (including two tables of measurements), the author gives a special part, with the following subjects:—*Aptenodytes demersa*, *Anas domestica*, *Anser domesticus*, *Ardea egretta*, *A. scapularis*, *Phasianus colchicus*, *Gallus domesticus*, *Crax blumenbachii*, *Meleagris gallipavo*, *Coturnix communis*, *Columba domestica*, *Ara* sp., *Cuculus cayanius*, *Cassicus haemorrhous*, *Crotophaga ani*, *Buteo vulgaris*, *Ictinea*

plumba, *Glaucidium ferrugineum*, *Noctua cunicularia*, *Strix flammea*, *S. bubo*, *Rhea americana*. In conclusion, he speaks (1) of the ciliary muscle, (2) of the iris.

CAPEN, E. A. Oology of New England. A Description of the Eggs, Nests, and Breeding Habits of the Birds known to breed in New England, with coloured illustrations of their Eggs. Boston: 1886, sm. folio, 116 pp., xxv pls.

This work [consisting of 12 parts] contains good representations of the Eggs of a large quantity of the Birds of America.

CAPEK, V. Ein Ausflug auf die Namiester-Teiche in Mähren. MT. orn. Ver. Wien, 1886, p. 151.

—. Aus dem Riesengebirge. T. c. pp. 241 & 242.

CARRUCCIO, A., & RAGAZZI, V. Specie Animali dell' America del Sud. Mem. Ac. Mod. 1884, pp. 129-177, [*Aves*, pp. 137-177.]

CARTER, T. [See SLATER, H. H.]

CATTANEO, G. Sulla Struttura e Formazione dello Strato Cuticolare (Corneo) del Ventricolo Muscolare degli uccelli. Boll. scient. 1886, pp. 87-92.

Risposta al dott. C. BERGONZINI, q. v.

CAZIN, M. La structure de la muqueuse du gésier des Oiseaux. Bull. Soc. Philom. x, pp. 57-61.

After mentioning the views of former authors, the writer states as conclusions derived from a closer study of the gizzard of the common Fowl and Duck, (i) that the "couche coriacée" is formed of columnar structures, following the tubes of the "couche glanduleuse," and never shows any canals; (ii) that the acidity belongs to the contents of the stomach, and not to the gizzard itself. The stain used was picrocarminate of ammonia; the sections were hardened with alcohol.

—. Recherches sur la structure de l'estomac des Oiseaux. C.R. cii, pp. 1031-1033.

The series of Birds examined belong to a large number of Families.

—. Observations sur l'anatomie du Pétrel Géant (*Ossifraga gigantea*, Linné). Bibl. haut. études, xxxi (1886), 27 pp., sep. pagin.

CHADBOURNE, A. P. [See *Spizella pusilla arenacea*, n. var. (*Fringillidæ*).]

CHARBONNEL-SALLÉ, —, & PHISALIX, —. De l'évolution postembryonnaire du sac vitellin chez les Oiseaux. C.R. cii, pp. 1496-1498.

The cases observed were those of the Pigeon, Fowl, and Duck.

— & —. Sur la sécrétion lactée du jabot des pigeons en incubations. C.R. ciii, pp. 286-288.

CHATIN, J. Contribution à l'étude ostéologique des fosses nasales chez les Palmipèdes et les Échassiers. Bull. Soc. Philom. ix (1885), pp. 128-130.

CLARKE, W. E. The Birds of Yorkshire. Tr. Yorksh. Union, pt. 9 (pub. 1886), pp. 65-80.

Containing Dipper, Black-bellied Dipper, White's Thrush, Missel Thrush, Song Thrush, Redwing, Fieldfare, Blackbird, Ring Ouzel, Rock Thrush.

—. [See also *Saxicola* (*Turdidæ*).]

COLLETT, R. On 5 for Norges Fauna nye Fugla fundne i 1883 og 1884. Forh. Selsk. Chr. 1884, No. 11.

—. On the Hybrid between *Lagopus albus* and *Tetrao tetrix*. P. Z. S. 1886, pp. 224-240, pls. xxi & xxii.

The above hybrid is fully discussed as regards its parentage, plumage, &c., and notes are added on other hybrids. Finally, the author gives some details of the habits and food, and of the skeleton.

—. Further notes on *Phylloscopus borealis* in Norway. Ibis, 1886, pp. 217-223.

—. [See also *Lanius* (*Laniidæ*).]

CORDEAUX, J. Wayside Notes from the Continent. Zool. 1886, pp. 354-362.

German ornithology.

CORY, C. B. The Birds of the West Indies, including the Bahama Islands, the Greater and the Lesser Antilles, excepting the Islands of Tobago and Trinidad. Auk, iii, pp. 1-59, 187-245, 337-381 & 454-472, cuts.

The author "gives no descriptions of well-known N. American Birds," and gives references mainly "to works and papers on West Indian Ornithology." 3 species are included, originally described by the author: *Myiadestes montanus*, (1881) p. 12, *Microligea palustris* and *Hirundo sclateri* (1884) pp. 44 & 58, *Phenicophilus dominicensis* (1881), p. 200, *Calyptophilus frugivorus* (1883) p. 201. The cuts are of the heads of various species. [See also *Mimus*, *Mimocichla* (*Turdidæ*), *Myiadestes* (*Sylviidæ*), *Certhiola*, *Chlorophanes* (*Cerebidæ*), *Ceryle stictipennis*, n. sp. (*Alcedinidæ*).]

—. A List of the Birds Collected in the Island of Grand Cayman, West Indies, by W. B. Richardson, during the Summer of 1886. T. c. pp. 501 & 502.

—. Descriptions of Thirteen New Species of Birds from the Island of Grand Cayman, West Indies. T. c. pp. 497-501.

[See *Certhiola sharpii* (*Cerebidæ*), *Dendroica vitellina* (*Mniotiltidæ*), *Chrysotis caymanensis* (*Psittaci*), *Centurus caymanensis*, *Colaptes gundlachi* (*Picidæ*), *Engyptila collaris*, *Zenaida spadicea* (*Columbidæ*), *Mimocichla ravida* (*Turdidæ*), *Icterus bairdi*, *Quiscalus caymanensis* (*Icteridæ*), *Spindalis salvini* (*Tunagridæ*), *Vireo alleni* (*Vireonidæ*), *Myiarchus denigratus* (*Tyrannidæ*), n. spp.]

—. On a Collection of Birds from several little-known Islands of the West Indies. Ibis, 1886, pp. 471-475. [Barbadoes, St. Vincent, Marie Galante, La Desirade, Grand Terre.]

[See *Chatura poliura* (*Cypselidæ*).]

[CORY, C. B.] [See also *Thryothorus guadeloupensis* (*Troglodytidae*), *Loxigilla richardsoni*, *L. barbadensis* (*Fringillidae*), *Ardetta neoxena* (*Ardeidae*), n. spp.]

COSTA, A. [See *Bernicla leucopsis* (*Anatidae*).]

COWPER, J. The Pentadactylous Pes in the Dorking Fowl. J. Anat. Phys. 1886, pp. 593-595.

A very technical description of the anatomy of the foot, from which the conclusion is drawn that the 5th toe represents the "hallux," which is therefore (contrary to usual opinion) wanting in other Birds.

CRÉPUT, M. [See *Struthio* (*Struthionidae*).]

CRETTE DE PALLUEL, A. Note sur la façon dont s'accomplit la mue des remiges et des rectrices chez certains Oiseaux. Bull. Soc. Acclim. 1886, pp. 534-543.

Females lose their wing feathers simultaneously as well as males, but somewhat later. This is probably the case with the *Palmipedes* and the *Rallidae*, and is doubtful in the *Tetraonidae*, *Phasianidae*, and some *Pas-seres*. (The remiges fall before the rectrices.) In the *Palmipedes* and *Rallidae* the author finds that the loss corresponds to a later assumption of these in the first instance by the young, as well as to a more backward development of the motor muscles of the wings. Gulls and Terns appear to lose their rectrices simultaneously, on the other hand.

CROWLEY, P. A Visit to the Breeding Quarters of the Spoonbill in Holland (Naarden). P. Croyd. Club, 1886, pp. 21-24.

CSATÓ, J. v. Addition of two species to list of [Hungarian] Birds [cf. Zool. Rec. xxii, *Aves*, p. 8]. Z. ges. Orn. 1886, p. 183.

CUMMING, W. D. [See SHARPE, R. B.]

DALBERG, F. Die Waldhühner des westlichen Mährens. MT. orn. Ver. Wien, 1886, pp. 25-27, 37 & 38.

DALGLEISH, J. J. [See *Larus* (*Laridae*).]

DALLA TORRE, K. W. v. Ornithologisches aus Tirol. MT. orn. Ver. Wien, 1886, pp. 49 & 50. [Cf. Zool. Rec. xxii, *Aves*, p. 8.]

—, & TSCHUSI, V. v. II. Jahresbericht (1883) des Comité's für ornithologische Beobachtungsstationen in Oesterreich und Ungarn. Orn. 1885, pp. 197-575. [Cf. Zool. Rec. xxi, *Aves*, p. 2.]

Increase from 46 to 83 stations. Record of Austro-Hungarian Literature of 1883.

DARESTE, C. Nouvelles recherches sur la production des monstruosités dans l'œuf de la poule, par une modification du germe antérieure à la mise en incubation. C.R. ciii, pp. 355 & 356.

—, Recherches sur l'évolution de l'embryon de la poule lorsque les œufs sont soumis à l'incubation dans la position verticale. T. c. pp. 696 & 697.

DAVISON, W. [See *Trochalopteryx cinnamomeum* (*Timeliidae*), *Merula erythrotis* (*Turdidae*), n. spp.]

DEDITIUS, C. Die ornithologischen Ergebnisse der N. Przewalsky'schen Reisen von Saisan über Chami nach Tibet und am oberen Lauf des Gelben Flusses in den Jahren 1879 und 1880. Aus dem russischen Originalwerke des Reisenden ausgezogen und übersetzt. J. f. O. 1886, pp. 524-543.

[See *Passer timidus* (*Fringillidae*), *Pyrgilauda barbata* (*Alaudidae*), *Orites calvus* (*Paridae*), n. spp.]

DE LA FONTAINE, —. Notes pour servir à la Faune Luxembourgeoise. Le Nat. 1886, pp. 291 & 292.

DENT, H. C. A Year in Brazil; with Notes on Natural History, &c. London: 1886, 8vo, xvii & 444 pp., maps and pls. [Birds, pp. 358-364.]

DES MURS, O. Musée Ornithologique illustré. Description des Oiseaux d'Europe, de leurs œufs, et de leurs nids. Tom. i. Les Oiseaux d'Eau. Classification—Synonymie—Description—Mœurs. Iconographie et Histoire Naturelle des Palmipèdes. Tom. ii. Les Oiseaux de Rivage et de Terre. Classification, &c., des Échassiers et des Coureurs. Paris: 1886, roy. 8vo, xii & 200 pp., 80 chromotypographies, and xi & 176 pp., 65 chromos.

Plates of Birds and Eggs, not free from error.

—. Proposition d'un système unique de Classification en Zoologie, spécialement pour l'ornithologie. Bull. Soc. Acclim. 1886, pp. 513-517.

The author advocates a classification beginning at the lowest forms. Apparently he would make no innovations on the methods of former authors, but wishes one scheme to become universal under the patronage of his Society.

DICKIE, A. M. Encycl. Amer. [cf. Zool. Rec. xxii, *Aves*, p. 8], vol. ii, art. Fowl, pp. 128-136, 13 cuts.

DINNIKA, N. Ornitologicheskaya Nabliudeniya na kavkazye. Trud. Petersb. xvii, pp. 260-378.

Ornithological observations in the Caucasus; being notes on a large number of species, among which may be mentioned *Tetrao mlokozievici* (9 pp.), *Garrulus krynickii*, *Buteo menetriesi*, *Picus pælzami*. The *Phasianidae*, *Tetraonidae*, *Scolopacidae*, and *Otididae* are treated of at the greatest length.

DIXON, J. H. Gairloch in N.-W. Ross-shire; its Records, Traditions, Inhabitants, and Natural History: with a Guide to Gairloch and Loch Maree, and a map. Edinburgh: 1886, 8vo, xlviii and 435 pp., illustrations.

Chapters are included by W. Jolly, Rev. J. McMurtrie and Prof. W. Ivison Macadam. Birds, pp. 241-256. [See *Plectrophanes nivalis* (*Fringillidae*), *Podiceps auritus* (*Podicipedidae*), *Eudromias morinellus* (*Charadriidae*).]

DOGIEL, J. Neue untersuchungen über den pupillen-weiternden Muskel der Säugethiere und Vögel. Arch. mikr. Anat. 1886, pp. 403-409, pl. xviii.

DOWDESWELL, G. F. On the Appearances which some Micro-organisms present under different conditions, as exemplified in the Microbe of Chicken Cholera. J. R. Micr. Soc. 1886, pp. 32-36, pl. vi.

DRESSER, H. E. A Monograph of the *Meropidae*, or Family of the Bee-Eaters. London: 1886, sm. fol. pt. v, pp. 133-144, 40A & 40B, Preface, Introduction, &c., pp. i-xx.

Plates are given of *Nyctiornis amictus*, *N. athertoni*, *Meropogon forsteni*, *Merops breweri*, *M. sumatranus*, *M. bicolor*, *M. viridis*. [See *Merops muscatensis*, n. sp. (pp. 40A & 40B).]

—. [See also *Troglodytes* (*Troglodytidae*).]

DRUMMOND-HAY, H. M. Report on the Ornithology of the East of Scotland, from Fife to Aberdeenshire inclusive. Scot. Nat. 1886, pp. 355-380.

DUBOIS, A. Revue des Oiseaux observés en Belgique. Bull. Mus. Belg. iv, pp. 1-24. [336 species.]

—. Liste des Oiseaux recueillis par M. le Capitaine Ém. Storms dans la région du Lac Tanganyika (1882-1884). T. c. pp. 147-150.

202 species, including *Buceros dubius* [cf. Zool. Rec. xxii, *Aves*, p. 49].

—. Compte Rendu des Observations Ornithologiques faites en Belgique pendant l'année 1885. T. c. pp. 178-210.

DUCKWORTH, W. [See MACPIERSON, H. A.]

DURY, C. On the Destruction of Native Birds. J. Cincinn. Soc. 1886 (ix), pp. 163 & 192.

DUTCHER, W. Bird Notes from Long Island, N. Y. Auk, iii, pp. 432-444. [Cf. Zool. Rec. xxii, *Aves*, p. 9.]

Notes on 24 species.

DYCHE, L. L. [See *Loxia* (*Fringillidae*).]

EDWARDS, C. L. The Relation of the Pectoral Muscles of Birds to the Power of Flight. Am. Nat. 1886, pp. 25-29.

A list of species with the ratio of the pectoral muscles to the weight of the body in each, following a few general remarks.

ELLIOT, H. W. An Arctic Province, Alaska and the Seal Islands. London: 1886, 8vo, xv & 473 pp., maps, plates, and cuts.

Containing a few notices of Sea Birds.

ERDMANN, —. Briefliches über Eierlegen. J. f. O. 1886, p. 405.

Corroboration of statement by JASSE, J.

EVANS, W. [See *Scolopax* (*Scolopacidae*), *Motacilla* (*Motacillidae*).]

EVERMANN, B. W. A List of the Birds observed in Ventura County, California. Auk, iii, pp. 86-94 & 179-186.

200 species are given, 108 breeding.

FAIRMAIRE, E. Les Rapaces de France. Mém. Soc. Saône, 1884, pp. 41-232.

i, les Rapaces diurnes; ii, les Rapaces nocturnes. Long articles on each species.

—. [See also *Diomedea* (*Procellariidæ*).]

FASZL, S. [See *Locustella* (*Sylviidæ*).]

FERRARI-PEREZ, F. Catalogue of Animals Collected by the Geographical and Exploring Commission of the Republic of Mexico. P. U. S. Nat. Mus. 1886, pp. 125-199. [Birds, pp. 130-182.]

[See *Amphispiza ferrari-perezi*, *Pipilo submaculatus*, *P. complexus* (*Fringillidæ*), *Anas diazi* (*Anatidæ*), *Philortyx personatus* (*Phasianidæ*), n. spp., *Psaltiriparus* (*Paridæ*).]

FINSCH, O. [See *Donacicola hunsteini*, n. sp. (*Ploceidæ*), *Carpophaga* (*Columbidæ*).]

— & MEYER, A. B. Vögel von Neu Guinea, zumeist aus der Alpenregion am sudostabhange des Owen-Stanley-Gebirges (Hufeisen-gebirge 7000-8000' hoch) gesammelt von Karl Hunstein. II. Z. ges. Orn. 1886, pp. 1-29, pls. i-vi. [Cf. Zool. Rec. xxii, *Aves*, p. 9.]

[See *Melidectes emilii* fig., *Melipotes fumigatus* fig., *Myzomela ramsayi*, *Ptilotis fulvocinerea* fig., (*Meliphagidæ*), *Arses henkii* figs., *Rhipidura cinnamomea* fig. (*Muscicapidæ*), *Charmosyna stellæ* fig., *Eos incondita* fig., *Psittacula madarászii* fig., *P. pallida* (*Psittaci*), *Eutrygon leucopareia*, *Ptilopus patruelis* fig. (*Columbidæ*), n. spp., *Microdynamis parva* fig. (*Cuculidæ*).] 88 species are given, several of which appear to be local varieties.

—. Nachschrift. *Paradisornis rudolphi* [cf. Zool. Rec. xxii, *Aves*, p. 42] loses its brilliancy in certain lights.

—. On some New Paradise Birds. *Ibis*, 1886, pp. 237-258. pl. vii.

A translation of a paper in the Zeitschrift für die gesammte Ornithologie. [Cf. Zool. Rec. xxii, *Aves*, pp. 9 & 42.] [See note on *Microdynamis*, *Ibis*, 1886, p. 524.]

FIORI, A. [See *Bucephala* (*Anatidæ*).]

*FISCHEL, W. [Peptone in Hen's Eggs during incubation]. Zeitschr. f. Phys.-Chem. x, (1885) pp. 11-13.

FISCHER, F., & PELZELN, A. V. Vögel und Säugethiere von Jan Mayen. Die internationale Polarforschung 1882-1883. Die österreichische Polarstation Jan Mayen. MT. orn. Ver. Wien, 1886, pp. 193-197, 206-212, & 217-219, pl. ix.

46 species are given, of which 16 are said to breed on the island. The latter include *Stercorarius poma[to]r[h]inus*, but possibly there may be an error, as there certainly is in pl. ix, fig. 3, where the head figured is that of *Alca torda*. [Also separately.]

FISHER, W. H. On the Destruction of Native Birds. J. Cincinn. Soc. (ix) 1886, pp. 167 & 204.

FOURNES, H. Vom Neusiedler See. MT. orn. Ver. Wien, 1886, pp. 157-162.

FOWLER, W. W. The Birds of the Alps. Rep. Marlb. Coll. Soc. 1885, pp. 27-42.

—. A Year with the Birds, by an Oxford Tutor. London: 1886, small 4to, pp. xii & 179, frontis. (2nd ed.).

FOX, W. H. List of Birds found in Roane Co., Tennessee, during April, 1884, and March and April, 1885. Auk, iii, pp. 315-320. [114 species.]

FRITSCH, A. [See *Tetrao* (*Tetraonidae*).]

GADOW, H. [See BRONN, H. G.]

GARMAN, S. On the Use of Polynomials as Names in Zoology. P. Bost. Soc. xxiii, pt. ii, p. 164.

He approves of Binomials, as more likely to be permanent, and would distinguish varieties, &c., by prefixing letters.

GATKE, H. I. Jahresbericht (1884) über den Vogelzug auf Helgoland. Ornith., 1885, pp. 164-196.

Record of occurrences in different winds, with short observations. 3 *Turdus varius* and 1 *Procellaria leachi* passed.

—. II. Jahresbericht (1885). T. c. pp. 101-148.

Including *Pyrrhula rosea*, *P. erythrina*, *Emberiza pusilla*.

GERLACH, L. Ueber eine neue Art der Herstellung von Glasfenstern in der Eischale von Vogeleiern vor oder in der ersten Zeit der Bebrütung. SB. phys.-med. Soc. Erlangen, 1885, pp. 51-56.

GIGLIOLI, E. H. Avifauna Italica. Elenco delle Specie di Uccelli stazionarie o di passaggio in Italia, colla loro sinonimia volgare e con notizie più specialmente intorno alle migrazioni ed alla nidificazione. Firenze: 1886, vii & 623 pp.

The title explains the scope of the work so well, that no more need be added, except that the district is made to contain Malta, Sicily, Sardinia, &c. Of the whole number, 80 are occasional stragglers, 6 doubtful, 207 residents, 69 summer and 36 spring visitants, 9 species of regular, 8 of irregular passage, 28 of very uncertain occurrence.

— & MANZELLA, A. Iconografia dell' Avifauna Italica, ovvero tavole illustranti le specie di uccelli che trovansi in Italia con brevi descrizioni e note. Prato (Toscana): 1885-1886, pts. xxviii-xxxiii, pagin. discount. [Cf. Zool. Rec. xxi. Aves, p. 15.] Only one part in 1885.

The species figured are *Cyanistes caeruleus*, *Anthus pratensis*, *Petronia stultia*, *Pyrrhocorax alpinus*, *Corvus cornix*, *Turdus musicus*, *Galerita cristata*, *Lycos monedula*, *Gallinula chloropus*, *Anas boschas*, *Agrodroma campestris*, *Corvus corone*, *Actitis hypoleucos*, *Gallinago gallinula*, *Chrocephalus minutus*, *Accentor montanellus*, *Nemura cyanea*, *Aedon galactodes*, *A. familiaris*, *Lagopus mutus*, *Fratercula arctica*, *Circus aeruginosus*, *Picus major*, *Accentor collaris*, *Ruticilla tithys*, *Emberiza citrinella*, *Buteo vulgaris*, *Regulus ignicapillus*, *Emberiza cirrus*, *Pica rustica*, *Rallus aquaticus*.

GOERING, A. Ornithologische Skizzen aus Argentinien. iv. Monat. Schutze Vogelw. 1886, pp. 284-286, pl.

Birds on a lagoon, of which a view is given.

GÜLDI, E. A. [See *Furnarius* (*Dendrocolaptidae*).]

GODMAN, F. D., & SALVIN, O. *Biologia Centrali-Americana*; or, Contributions to the Knowledge of the Fauna and Flora of Mexico and Central America. London: 1886, 4to; Zoology, pt. xlv, Aves, pp. 361-368, pls. xxv-xxvii; pt. xlviii, pp. 369-392, pl. xxviii; pt. l, pp. 393-408, pls. xxix & xxx; pt. li, pp. 409-416; pt. lii, pp. 417-440, pls. xxxi & xxxii; pt. liii, pp. 441-448.

Containing *Fringillide*: genera *Cyanospiza*, *Haplospiza*, *Amphispiza*, *Zonotrichia*, *Junco*, *Chondestes*, *Spizella*, *Passerculus*, *Poocetes*, *Coturniculus*, *Melospiza*, *Peucea*, *Hæmophila*, *Chamæospiza*, *Pyrgisoma*, *Atlapetes*, *Pipilo*, *Embernagra*, *Spiza*, *Calamospiza*, *Calcarius*, *Carpodacus*, *Loxia*, *Coccothraustes*, *Chrysomitris*, *Sycalis*, *Acanthidops*, and *Sporophila othello*, *Oriturus mexicanus*, spp. *incertæ sedis*. *Icteride*: genera *Eucorystes*, *Gynostinops*, *Ostinops*, *Cassicus*, *Cassiculus*, *Cassidix*, *Amblycercus*, *Dolichonyx*. Figures are given of *Cyanospiza rosila*, *Junco alticola*, *Zonotrichia vulcani*, *Haplospiza uniformis*, *Zonotrichia quinquestrata*, *Spizella pinetorum*, *Peucea notosticta*, *Ammodromus petenicus*, *Hæmophila humeralis*, *H. rufescens*, *H. superciliosa*, *H. ruficauda*, *Chrysomitris atriceps*, *C. xanthogastra*, *Ostinops guatemozinus*. [See *Hæmophila lawrencii*, *Chrysomitris forreri*, n. spp. (*Fringillide*).]

GOODCHILD, J. G. Observations on the Disposition of the Cubital Coverts in Birds. P. Z. S. 1886, pp. 184-203, 46 cuts.

An exhaustive treatise on the above subject, with respect to the different families. The author considers that up to a certain point there is a considerable parallelism between the style of imbrication of the coverts and the structure of the bird in other ways; but he is not prepared at present to press it as a means of or aid to classification, though he considers draughtsmen should pay much more attention to it than they do.

Goss, N. S. A Revised Catalogue of the Birds of Kansas, with descriptive notes of the Nests and Eggs of the Birds known to breed in the State. Topeka: 1886, 8vo, vi & 76 pp. [Cf. Zool. Rec. xxi, *Aves*, p. 16.]

— . Additions to the Catalogue of Kansas Birds. Auk, iii, pp. 112-115. [15 species.]

GOULD, J. [the late]. The Birds of New Guinea and the adjacent Papuan Islands, including any new species that may be discovered in Australia. Pts. xxi & xxii. London: 1886, fol. [Cf. Zool. Rec. xxii, *Aves*, p. 11]. The letterpress is by R. B. SHARPE.

The species (all figured) are *Erythroriorchis doriae*, *Drepanornis bruijnii*, *Eos fuscata*, *Ægotheles wallacii*, *Meliarchus sclateri*, *Stigmatops kebirensis*, *S. squamata*, *Xanthotis chrysotis*, *Rhipidura rubrofrontata*, *Pachycephala collaris*, *Calornis feadensis*, *Dicaeum pectorale*, *Pseudogerygone notata*, *Astur melanochlamys*, *Ninox dimorpha*, *Psittacella madarazi*,

Oeyx gentiana, *Edolisoma poliopse*, *Rhipidura hyperrythra*, *Melanopyrrhus anais*, *M. orientalis*, *Amblyornis subalaris*, *Melirrhophetes batesi*, *Megapodius brenchleyi*, *Pseudogerygone chrysogastra*, *P. cinereiceps*.

GRABOWSKY, F. J. Biologische Notizen über einige Vögel Süd-Ost-Borneo's. Orn. : 1885, pp. 149-163.

Remarks on 48 Birds, concerning the localities affected by them, their breeding habits, nests, and eggs. Young in down of several species were also obtained. The native names are often derived from the bird's note.

GRESSNER, H. Zur Kenntniss des Atavismus bei Vögeln. J. f. O. 1886, p. 402.

An account of a curious case of a hen with three claws on the end of one wing, which were sharp, curved at the point, and somewhat smaller than those of the foot. This shows a tendency to revert to an original hand, and recalls *Archaeopteryx*.

——. Ueber partiellen Albinismus infolge von Mauserung. T. c. p. 403.

Changes of colour in moulting.

——. Ueber partiellen Albinismus an der Haubenlerche. T. c. p. 404. [Crested Lark.]

——. Notiz zur Kenntniss des partiellen Albinismus bei Vögeln. T. c. p. 404.

GRONDAL, B. Verzeichniss der bisher in Island beobachteten Vögel (1886). Orn. 1886, pp. 355-374.

GUILLEMARD, F. H. H. The Cruise of the 'Marchesa' to Kamschatka and New Guinea, with notices of Formosa, Liu-Kiu, and various Islands of the Malay Archipelago. London: 1886, 8vo, 2 vols., xvii, 284 pp., & xvi, 399 pp., maps, cuts, and col. fronts.

An interesting account of travel and discovery; several new species of Birds were found, for which see Zool. Rec. xxii, *Aves*, p. 12.

GUPPY, H. B. Edible Birds' Nests. Zool. 1886, pp. 336 & 337. [The substance. [Cf. Zool. Rec. xxii, *Aves*, p. 48.]

GURNEY, J. H. Note on the Nestling Plumage of *Gypsoictinia melano-sternon*. [Cf. Zool. Rec. xxi, *Aves*, p. 57.] Ibis, 1886, pp. 457 & 458.

——. Notes on a Female Specimen of *Pernis apivorus*. Tr. Norw. Soc. 1886, pp. 249-253.

——. [See also *Aquila* and *Lophotriorchis* (*Falconidæ*) and AYRES, T.]

GURNEY, J. H., JUN. Ornithological Notes from North Norfolk. Zool. 1886, pp. 168-170 & 390-393.

——. [See also *Porphyrio* (*Rallidæ*), *Ruticilla* (*Sylviidæ*).]

—— & SOUTHWELL, T. Fauna and Flora of Norfolk. Part xi, Birds. Section i. Tr. Norw. Soc. 1886, pp. 259-286.

HAAST, J. V. On *Megalapteryx hectori*, a new gigantic species of Apterygian Bird. Tr. Z. S. xii, 7, pl. xxx. [Cf. Zool. Rec. xxi, *Aves*, p. 68.]

— On *Dinornis oweni*, a New Species of the *Dinornithidæ*, with some remarks on *D. curtus*. T. c. 8, pls. xxxi & xxxii. [Cf. Zool. Rec. xxii, *Aves*, p. 61.]

HALLIBURTON, W. D. Note on the Colouring Matter of the Serum of Certain Birds. J. Physiol. 1886, pp. 324–326, pl. xii.

A yellow lipochrome is found in the blood serum of the Pigeon, Fowl, and Dove (and in the Tortoise), easily extracted by ethylic alcohol. As it is identical with the colouring-matter of the fat, it might be expected to be found (as it is) in certain muscles, where fat occurs.

HAMONVILLE, L. D'. Nouveautés ornithologiques. Bull. Soc. Z. Fr. 1886, pp. 311–318 & 503–511.

Description of *Metallura tyrianthina* var.?, *Amazilia graysoni*, *Pyrrhophena castaneiventris*, an n. sp.?, *Olytolama aurescens*, *Lophornis pavoninus* (*Trochilidæ*), and a review of the Birds of Paradise (with a table of genera and species), chiefly concerned with Hunstein's discoveries in New Guinea. [Cf. Zool. Rec. xxii, *Aves*, p. 9.]

— [See also *Anas* (*Anatidæ*).]

HARGITT, E. Notes on Woodpeckers. No. xi. On a New species from Arizona. No. xii. On the Genus *Chrysophlegma*. Ibis, 1886, pp. 112–115 & 260–281. [Cf. Zool. Rec. xxii, *Aves*, p. 47.]

In No. xi the species is *Picus arizonæ*; in No. xii the author only includes 6 species (transferring the others to *Gecinus*), of which he gives a key. [See *Chrysophlegma* (*Picidæ*).]

HARTERT, E. Ornithologische Ergebnisse einer Reise in den Niger-Benuë-Gebieten. J. f. O. 1886, pp. 570–577.

After a general introduction the author gives notes on 187 species. [See *Poliospiza flegeli* (*Fringillidæ*) n. sp., *Drymaca* (*Timeliidæ*), *Cinnyris* (*Nectariniidæ*), *Euplectes* (*Ploceidæ*), *Corvus* (*Corvidæ*), *Scotornis* (*Caprimulgidæ*), *Merops* (*Meropidæ*), *Falco*, *Neophron* (*Falconidæ*), *Francolinus* (*Phasianidæ*), *Ciconia*, *Leptoptilus* (*Ciconiidæ*), *Glareola* (*Charadriidæ*), *Plectropterus* (*Anatidæ*).]

HARTING, J. E. A Perfect Booke for Keping of Sparhawkes or Goshawkes. Written about 1575. Now first printed from the original MS. on vellum, with Introduction [Review of Early English literature of Falconry, including MSS., Nature and Value of Present Treatise] and Glossary. London: 1886, 8vo, xxxii & 51 pp., pl.

Perhaps of more interest to archæologists than to ornithologists.

— On the Moulting of the Flight-feathers in the Common Wild Duck. Zool. 1886, pp. 228–233.

Chiefly a translation of the investigations of D'Hamonville [cf. Zool. Rec. xxi, *Aves*, p. 17], with the addition of a description of the drake's change of plumage, by Waterton.

[HARTING, J. E.] On the Former Nesting of the Spoonbill in Middlesex.
T. c. pp. 81-88, pl. i.

In the Bishop of London's park at Fulham.

HARTLAUB, G. On a New Species of Barbet of the Genus *Trachyphonus* [and other species]. *Ibis*, 1886, pp. 105-112, pl. v.

[See *Trachyphonus shelleyi*, n. sp. (*Capitonidæ*), and cf. *Zool. Rec.* xxii, *Aves*, p. 50.]

—. Description de trois nouvelles espèces d'oiseaux rapportées des environs du lac Tanganyika (Afrique Centrale), par le capitaine É. Storms. *Bull. Mus. Belg.* iv, pp. 143-146, pls. iii & iv.

[See *Turdus stormsi* (*Turdidæ*), *Ploceus duboisi* (*Ploceidæ*), *Lagonosticta nitidula* (*Ploceidæ*), n. spp.]

—. [See also *Tympanistria virgo*, n. sp. (*Columbidæ*).]

HARTWIG, W. Die Vögel Madeiras. *J. f. O.* 1886, pp. 452-586.

The author gives a list of the native names of the species breeding in the island (among which he will not admit *Sylvia conspicillata*, *Marmora*), and a short appendix on Teneriffe. He considers *S. heinekeni*, Jardin [rectius Jardine] distinct, and enumerates 99 other residents and migrants.

HARVIE-BROWN, J. A. Further Notes on North Rona, being an Appendix to Mr. John Swinburne's Paper on that Island in the "Proceedings" of this Society, 1883-84. *P. Phys. Soc. Edinb.* 1885-86, pp. 284-299, pl. xi.

The Whimbrel was seen (probably breeding).

—. [See also *Phylloscopus* (*Sylviidæ*).]

HAYEK, G. [See BLASIUS, W.]

HELM, F. Die Hautmuskeln der Vögel. *Monat. Schutzv. Vogelw.* 1886, pp. 295-301 & 337-341.

The author divides his discussion of the skin muscles into (A) Those which are connected with single feathers; (B) Those which are attached to the whole of a feather tract, and describes the latter singly.

—. [See also MEYER, A. B.]

HENDRICKS, J. E. The Mechanics of Soaring. *Am. Nat.* 1886, pp. 532-534.

A mathematical criticism of a paper by I. LANCASTER (q. v.). The current of air which must be present to support the bird, or cause motion upwards, must have a greater vertical component than the weight of the plane has. [The plane represents the bird].

HENKE, K. G. [See *Lagopus* (*Tetraonidæ*).]

HENSHAW, H. W. List of Birds Observed in Summer and Fall on the Upper Pecos River, New Mexico. *Auk*, iii, pp. 73-80. [Cf. *Zool. Rec.* xxii, *Aves*, p. 13.]

[See *Empidonax* (*Tyrannidæ*), *Selasphorus* (*Trochilidæ*).]

—. [See also *Aphelocoma insularis*, n. sp. (*Corvidæ*).]

1886. [VOL. XXIII.]

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HERRICK, C. L. Osteology of the Evening Grosbeak, *Hesperiphona vespertina*, Bonap., with pl. i and Frontispiece. Bull. (Sci. Lab.) Denison Univ. 1885, pp. 5-15.

HODEK, E., SEN. Ein—für Europa—neuer Pelikan und die Geschichte seiner Erlegung. MT. orn. Ver. Wien, 1886, pp. 1-3, 13-15, 27, 28, & 39.

Possibly *P. rufescens* [or a variety of *P. onocrotalus*, cf. Ibis, 1886, p. 372].

—, JUNR. Kurzer Ausflug über das Mittelmeer. T. c. pp. 129, 130, 137 & 138.

HOMER, A. v. Neue Gesichtspunkte betreffs Aurikelfrass. Monat. Schutze Vogelw. 1886, pp. 94-99.

HOMER, E. F. v. [See TSCHUSI ZU SCHMIDHOFFEN, V. v., and MEVES, W.]

HOXIE, W. [See *Catharista* (*Cathartidæ*).]

JAMES, J. F. Catalogue of the Birds in the Collection of the Cincinnati Society of Natural History. J. Cincinn. Soc. 1886 (ix), pp. 52-64.

—, On the Destruction of Native Birds. T. c. p. 219.

JASSE, J. Zur Frage "Wie Kommt das Ei zu Tage, mit dem spitzen oder mit dem stumpfen Ende?" J. f. O. 1886, pp. 124 & 125.

A re-statement of the fact, already well known, that the larger end of the egg comes first in the process of laying. [Cf. ERDMANN, —.]

JOHNSON, J. Y. Madeira: its Climate and Scenery. A Handbook for Visitors, with Chapters on the Fauna, Flora, Geology, and Meteorology. London: 1885, 3rd edition, 16mo, xxxii & 303 pp., 3 maps, and plan of Funchal. [Birds, pp. 192-198.]

JOHNSTON, H. H. The Kilima-njaro Expedition; a Record of Scientific Exploration in Eastern Equatorial Africa, and a general description of the Natural History, Languages, and Commerce of the Kilima-njaro District. London: 1886, 8vo, xv & 572 pp., 6 maps, and 80 illustrations, &c. Birds, pp. 356-361, 377-387. [For new species, &c., see Zool. Rec. xxii, *Aves*, p. 29.]

JONES, H., & JONES, N. E. [MRS.]. Illustrations of the Nests and Eggs of the Birds of Ohio, with Text. Circleville, Ohio: 1886, folio, 329 pp., 68 pls.

This work, which has been issued in parts since 1879, was brought to a conclusion by the 23rd part in 1886. Part 19 (1884), part 20 (1885), parts 21, 22, 23 (1886). The plates, which are admirable, were begun by Misses G. E. Jones and E. J. Shultze, and are continued by Mrs. Jones. The letterpress is by Howard Jones.

JOURDRAN, E. Observations sur les Oiseaux, année 1885. Bull. Soc. Angers, 1886, p. 257.

From department Maine et Loire.

KELLER, F. C. Einige kleine Beobachtungen aus den Alpen. Z. ges. Orn. 1886, pp. 252-266.

—. [See also *Gypaëtus* (*Falconidæ*).]

KERSCHNER, L. Zur Zeichnung der Vogelfeder. Arb. z. Inst. Graz. i, pp. 183-200.

Although this is only a preliminary communication, there is much of interest in it. The author traces the complicated ornamental feather-marks of the peacock through all the stages back to the simple marks of reddish yellow and black cross-bars. This simply marked feather, again, is reduced to one of a yellowish brown with dark grey spots. The same applies to all the Rasores. The author gives an exhaustive tabular arrangement, in which the modifications of ornaments, as shown by Raptorial and Rasorial Birds, may be referred to cross-bars, spots, dots, eyes, arches, change of ground colour, longitudinal central stripes, &c. A considerable portion of the paper is devoted to a discussion as to how far these changes are explicable by natural or by sexual selection, and how far there is a distinct correlation between the sexual life (going hand in hand with nervous excitability) and the ornamental plumage.

KINBERG, J. H. [See *Anser* (*Anatidæ*).]

KLEE, R. Bau und Entwicklung der Feder. Z. Naturw. 1886, pp. 110-152, pl.

A very full discussion of the feathers of Birds, under the following heads: 1, method of preparation; 2, feathers of the young Bird in the Classes *Ratitæ* and *Carinatæ*; 3, feathers of the adult (parts described, histology, pigment, construction of the feather and its adjuncts, development of the aftershaft, quills, "cutispapille" "federscheide," history of the horn and marrow substance, pigment); 4, the forms of permanent feathers (contour feathers, down, hair-feathers, "plättchen" feathers); 5, the disposition of feathers; 6, the renewal of feathers; 7, the first arrangement of scales, feathers, and hairs; 8, systematic arrangement by feathers; 9, literature of the subject. The author wishes to make three classes:—

I "Reptile-like Birds" with only one sort of covering, like the down of an embryo. No means of flight, &c.

II "First Flyers" with down.

(a) With tail and feather down.

(b) With the appearance of a greater quantity of down and transition of "Federkleide" into "Konturfedern" and down.

III All other Birds.

(a) With a certain amount of flying power.

(b) With its greatest perfection.

KOENIG, A. Die Vogelwelt auf der Insel Capri. J. f. O. 1886, pp. 487-524.

A general account, followed by a list of 97 residents and migrants.

KOENIG-WARTHAUSEN, R. Ornithologische Jahresbericht, 1885. J.H. Ver. Württ. 1886, pp. 146-166.

[KOENIG - WARTHAUSEN, R.] "Bauchschwangerschaft" bei Vögeln
T. c. pp. 316-320.

*KOLOMBATOVIĆ, G. Imenik Kralješnjaka Dalmacije. i, dio Sisavci i Ptice. ii, e Aggiunte al vertebrati della Dalmazia. Split [Spalato]: 1885, 8vo, 38 pp.

A catalogue of the Vertebrates of Dalmatia.

—. Imenik Kralješnjaka Dalmacije. II. Dio Dvoživci, Gmazovi, i Ribe. 3^e Aggiunte ai Vertebrati. Split [Spalato]: 1886.

Birds, pp. 21-23, 7 additional species.

LANCASTER, I. The Mechanics of Soaring. *Am. Nat.* 1886, pp. 326-333.
[*Cf. Zool. Rec.* xxii, *Aves*, p. 19.]

—. Gravitation and the Soaring of Birds. *T. c.* pp. 514-521. [*Cf. HENDRICKS, J. E.*]

The author states that a Bird soars without muscular effort, because it throws itself over at such an angle that the resolved part of the force of gravity which acts at right-angles to its plane produces motion in an upward direction when taken in connection with the compression of the air.

LANDOIS, H. Westfalens Thierleben. Die Vögel in Wort und Bild. Paderborn und Munster: 1886, 364 pp., 37 pls. and cuts.

—. Apterismus bei Vögeln. *J.B. westf. Ver.* 1885, p. 18.

The subjects are chickens.

—. Über einen merkwürdigen Einschluss in einem Hühner-Ei.
T. c. p. 37.

A curious brown body (27×21×14 mm.) found in an egg.

LANGDON, F. W. On the Destruction of Native Birds. *J. Cincinn. Soc.* 1886, ix, pp. 181 & 220.

LANGILLE, J. H. Nidification of Birds [Coots, Rails, Ducks, Bittern, &c.] on the St. Clair Flats. *Bull. Buff. Soc. Nat. Sci.* v, pp. 33-39.

LAULANIÉ, M. F. Sur le mode d'évolution et la valeur de l'épithélium germinatif dans le testicule embryonnaire du poulet. *Bull. Soc. Toulouse*, 1886, pp. 13-16.

An entirely new view of the relation between the elements of the testicle, on the one hand, and the epithelium and Wolffian body, on the other; very significant as regards hermaphroditism. Other points of importance are mentioned, which cannot be easily abbreviated.

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[See *Ceryle stictipennis* (*Alcedinidae*), n. sp.]

—. Characters of Two Supposed New Species of Birds from Yucatan. *Ann. N. York Ac.* iii, pp. 273 & 274.

[LAWRENCE, G. N.] Description of a New Species of Bird of the Genus *Engyptila*, with Notes on Two Yucatan Birds. *Ibid.*

[See *Polioptila albiventris*, *Engyptila vinaceifulva* (Columbidæ), *Chætura peregrinator* (Cypselidæ), n. spp., *Engyptila fulviventris* (Columbidæ), *Chætura gaumeri* (Cypselidæ).]

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Pathological—various species as subjects.

LESCUYER, F. *Mélanges d'Ornithologie*. *Mém. Soc. Sâone*, 1885, pp. 15-31.

Chiefly a "memoir" on questions proposed at the Vienna Ornithological Congress.

LIEBE, K. T. *Ornithologische Skizzen*. ix. Der Zeimer (*Turdus pilaris*). x. Der Weindrossel (*T. iliacus*). xi. Der Zippdrossel (*T. musicus*). *Monat. Schutze Vogelw.* 1886, pp. 4-11, 30-34, & 310-315, 3 pls.

LILFORD [LORD]. *Coloured Figures of the Birds of the British Islands*. London: 1886, 8vo, pts. ii & iii.

Containing *Turdus atrigularis*, *Saxicola deserti*, *Pratincola rubetra*, *P. rubicola*, *Sylvia curruca*, *S. hortensis*, *Acrocephalus turdoides*, *A. luscinioides*, *A. phragmitis*, *Falco subbuteo* (juv.), *Cyanecula suecica*, *C. leucocyana* (in pt. ii); *Turdus varius*, *Hypolais icterina*, *Acrocephalus streperus*, *A. palustris*, *Phylloscopus sibilatrix*, *Hirundo rustica*, *Chelidon urbica*, *Cotile riparia*, *Cypselus melba*, *Scops giu*, *Athene noctua*, *Falco subbuteo* (♂ ad.) (in pt. iii).

— Notes on the Ornithology of Northamptonshire and the Neighbourhood. *Zool.* 1886, pp. 465-471. [*Cf. Zool. Rec.* xxii, *Aves*, p. 20.]

LITTLEBOY, J. E. Notes on Birds observed in Hertfordshire during the year 1885. *Tr. Hertf. Soc.* iv, pp. 53-64.

13 additions to former lists [*cf. Zool. Rec.* xxii, *Aves*, p. 20].

*LLAVE, P. DE LA. Sobre tres especies nuevas del género "Tetrao." *La Naturaleza*, 1885, pp. 63 & 64.

LORENZ, L. v. [See PEIZELN, A. v.]

LUCAS, F. A. [See *Chætura* (Cypselidæ).]

LUNEL, G. Note sur une monstruosité observée chez un Goeland Rieur (*Larus ridibundus*, Linné). *Mém. Soc. Sâone*, 1884, pp. 3-9, pl.

Absence of hind toe and multiplication of other toes on the same feet.

LÜTKEN, C. F. II Jahresbericht (1884) über die ornithologischen Beobachtungsstationen in Dänemark. *Ornis*, 1886, pp. 49-100. *Cf. Zool. Rec.* xxii, *Aves*, p. 20.]

157 species.

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MACOUN, J. M. List of Birds Collected at Lake Mistassini [Canada]. Rep. Geol. & N. H. Surv. Canada, pp. 35 & 36.

MACPHERSON, H. A. The Birds of Skye, with special reference to the Parish of Duirinish. Part I, 1886. P. Phys. Soc. Edinb., 1885-86, pp. 118-143. [With notes by J. A. HARVIE-BROWN.]

Out of 153 species, 3 are new to the Hebrides (*Sylvia nisoria*, *Sitta caesia*, *Puffinus major*). Notes on breeding.

——. [See also *Puffinus* (*Procellariidæ*), *Fuligula* (*Anatidæ*).

——, & DUCKWORTH, W. The Birds of Cumberland critically studied, including some Notes on the Birds of Westmoreland. Carlisle : 1886, 8vo, xx & 206 pp., map and col. front.

81 migrants, 84 residents, and 85 rare visitants are included in the list.

MADARÁSZ, J. v. [See *Pipra dubia* (*Pipridæ*), *Myiophoneus tibetanus* (*Turdidæ*), *Pucrasia meyeri* (*Phasianidæ*), n. spp., *Tetraophasis* (*Tetraonidæ*).]

MAGNIEN, L. Sur le ganglion géniculaire des Oiseaux. C.R. c, pp. 1507-1509.

MANGEARD, A. Catalogue raisonné des Oiseaux qui se reproduisent dans les environs d'Autun, observés depuis 1840 jusqu'en 1884. Mém. Soc. Saône, 1885, pp. 29-35.

MANZELLA, A. [See GIGLIOLI, E. H.]

MAREY, —. Étude sur les mouvements imprimés par l'aile d'un Oiseau; expériences de M. Müller. C.R. cii, pp. 1137-1139.

Experiments on the motive power of Birds rising from rest, &c.

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MATTHIESSEN, L. Ueber den physikalisch-optischen Bau des Auges der Vögel. Arch. ges. Phys. 1886, pp. 104-112, pl. i.

MCALDOWIE, A. M. Observations on the Development and the Decay of the Pigment Layer on Birds' Eggs. J. Anat. Phys. 1886, pp. 225-237.

In an interesting paper the author remarks that only two colours (red and green) besides black are found on eggs. The amount of pigmentation is in a direct ratio to the sun's rays which fall on them, and its effect and primary cause is the protection of the interior of the egg, in which the germinal spot is always uppermost and most exposed. Green is the most effective colour for this purpose, red is the complement to green, and black intensifies both; they are all derived by metamorphosis from the hæmatin of the red blood-corpuscles. Green was the first colour developed in the early days of bird life, red followed, chiefly for purposes of concealment (this colour is at times produced by food). This concealment is the secondary cause of pigmentation; hence those birds whose

eggs no longer need colour may be supposed to have lost it, viz., such as breed in holes (or where that is the general custom of the family), and such as are covered by the parent on leaving them, or are naturally covered by incrustations. For we find that the more eggs are sheltered, the less is the colouration.

MEARNS, E. A. Some Birds of Arizona. Auk, iii, pp. 60-73 & 289-307.

[See *Buteo*, *Urubitinga* (*Falconidæ*), *Harporhynchus* (*Turdidæ*).]

MENZBIER, M. Die Zugstrassen der Vögel im Europaischen Russland. Bull. Mosc. 1886, pp. 291-369, pls. i & ii [maps].

A full account of the lines of Bird-migration.

[See also ZAROUDNOI, M., and *Gecinus flavirostris*, n. sp. (*Picidæ*).]

MERLATO, L. [See *Struthio* (*Struthionidæ*).]

MEVES, W. Die Grösse und Farbe der Augen aller Europäischen Vögel, sowie der in der palæarctischen Region vorkommenden Arten in systematischer Ordnung nach Carl Sundevall's Versuch einer natürlichen Aufstellung der Vogelklasse. Halle: 1886, sm. 8vo, iv & 74 pp.

The sizes of eyes of ♂ and ♀ of 649 species; variation of colour of eyes due to age; about 60 per cent. being from personal observation.

—. C. J. Sundevall's Einleitung zu seinem Versuch einer natürlichen Eintheilung der Vogelclasse. Ornis, 1885, pp. 302-354.

Remarks on the development of ornithological systems, on grounding them on affinity, on the purpose and scope of systematic arrangement and its results. Also on the system here proposed and on systematic nomenclature.

—. Ornithologische Beobachtungen grösstentheils im Sommer 1869 auf einer Reise im Nordwestlichen Russland gesammelt. Ornis, 1886, pp. 181-288. [Translated into German by Frau Meves; annotated by E. F. v. Homeyer.]

Interesting notices, among others, of *Loxia pityopsittacus* (nest & eggs), *Carpodacus erythrinus*, *Emberiza rustica*, *E. pusilla*, *E. aureola*, *Locustella fluviatilis*, *L. lanceolata*, *L. certhiola*, *Calamoherpe magnirostris*, *Iduna salicaria*, *Phyllopneuste borealis* [new to Europe], *P. middendorffi*, *P. coronata*, *Lagopus lapponicus* (*subalpina*), *Larus minutus*, *Terekia cinerea*. Also, pp. 187 & 188, remarks on the position of *Eurypyga helias* and *Dromas ardeola*. The author makes a division of birds according to their state on emerging from the egg.

MEYER, A. B. Abbildungen von Vogel-Skeletten herausgegeben mit Unterstützung der Generaldirection der königl. Sammlungen für Kunst und Wissenschaft in Dresden. Dresden: 1886, pts. x & xi, pp. 57-64, pls. xci-cx. [Cf. Zool. Rec. xxii, Aves, p. 22.]

The plates are of *Athene noctua*, *Nyctea nivea*, *Dryoscopus bicolor*, *Colinus nigricollis*, *Xanthotis rubiensis*, *Calornis neglecta*, *Arses telescopthalma*, *Monarcha chalybeocephalus*, *Corvus scapularis*, *Columba gutturalis*

maxima, *Crossoptilon mantchuricum*, *Numida mitrata*, *Perdix cinerea*, *Peloperdix javanica*, *Tetrao tetrax*, *Lagopus albus*, *Gallus caudatus*, *Otis tetrax*, *Balearica pavonina*, *Machetes pugnax*, *Ægialitis dubia*, *Ortygometra nigra*, *Alca torda*, *Daption capense*.

[MEYER, A. B.] Note on *Centurus striatus*, Müll. Gefiederte Welt, 1886, p. 253.

—. Neue Paradiesvögel von Neu-Guinea. Monat. Schutze Vogelw. 1886, pp. 85-88, pl.

Two species (*Parad. rudolphi*, *Astrarch. stephanie*) recorded in Zool. Rec. xxii, *Aves*, p. 9.

—. On a Fourth Male Specimen of King William the Third's Paradise-Bird. P. Z. S. 1886, pp. 297 & 298.

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Thirty-five species sent by Léon Laglaize, including several only lately described.

—. [See also FINSCH, O.]

[See also *Lophorhina* (*Paradiseidae*), *Euthyrhyncha* (*Meliphagidae*), *Lagopus*, *Tetrao* (*Tetraonidae*).]

— & HELM, F. I. Jahresbericht (1885) der Ornithologischen Beobachtungsstationen im Königreich Sachsen. viii & 82 pp., map.

MIDDENDORF, E. v., and SEIDEL, —. I. Ornithologischer Jahresbericht (1885) aus dem Gouvernement Livland (Russland). Orn. 1886, pp. 376-396.

MILLAIS, J. G. [See *Loxia* (*Fringillidae*), *Anthus* (*Motacillidae*), *Charadrius* (*Charadriidae*).]

MILNE-EDWARDS, A. Abhandlung über die Fauna der Antarktischen Region. MT. orn. Ver. Wien, 1886, pp. 50, 51 & 63, 64. [Cf. Zool. Rec. xxi, *Aves*, p. 23.]

Ch. v. *Procellariidae* contd.

MOJSISOVICS, A. v. Bericht über eine Reise nach Südungarn und Slavonien im Frühjahr, 1884. MT. Ver. Steierm. 1885, pp. 57-108.

An interesting account of a journey, with full notes on the Birds observed in the woodland parts and on the rivers, lakes, and marshes (noticeably those of Obedska and Kolodjvár).

—. Biologische und faunistische Beobachtungen über Vögel und Säugethiere Südungarns und Slavoniens in den Jahren 1884 and 1885 (zugleich ein II Nachtrag zur Orn. von Bélye und Dárda). MT. Ver. Steierm. 1885, pp. 109-204, 2 cuts (mammals). [Cf. Zool. Rec. xx, *Aves*, p. 10.]

[See *Sterna* (*Laridae*).]

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— Ornithologie de Saône & Loire. T. c. 1886, 1st Fascicule (all), iv & 68 pp.

1. Introduction. 2. Les Plumes. 3. Utilité des Oiseaux. 4. Cataclysmes ornithologiques et migrations des Oiseaux. 5. Constitution ornithologique du département de Saône et Loire. 6. Topographie ornithologique de Saône et Loire.

— [See also *Perdortyx*, *Perdicula* (*Phasianidæ*).]

MONTLEZUN, A. DE. Note sur les Palmipèdes Lamellirostres. Bull. Soc. Acclim. 1886, pp. 132-167, cuts.

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— [See also *Bernicla* (*Anatidæ*).]

MORRIS, C. Encycl. Amer. vol. ii [cf. Zool. Rec. xxii, *Aves*, p. 8], art., Falcon, pp. 9 & 10, 2 cuts.

MOSELEY, H. N. Feathers of the Dodo. P. Am. Ass., Sept. 1884 (pub. 1885), p. 542. [Cf. Zool. Rec. xxi, *Aves*, p. 23.]

*MÜLLENHOFFS, K. Die grösse der Flugflächen. Pflügers Arch. ges. Phys. xxxv (1884), 48 pp., 8vo.

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— Ueber die Anwendung der Momentphotographie zur Beobachtung des Vogelfluges. Vortrag geh. a 30 Mai, 1885, im Deutsch Ver. Förd. d. Luftsschaffahrt.

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NEVILL, H. A Lesser and Unidentified Pelican breeding in Ceylon. The Taprobanian, 1886, p. 162.

NEWTON, A. Encycl. Brit., ed. 9, vol. xx: Artt. Puff-bird [*Bucconidæ*], Puffin, Quail, *Quozal [*Trogonidæ*] fig., *Rail, Raven, Razorbill, Redbreast, Redstart, Redwing, *Rhea fig., *Riflebird [*Paradisidæ*?], Roller, Rook. Vol. xxi: Artt. Ruff fig., Sand-grouse, Sandpiper, Scaup, Scoter, *Screamer, *Scrub-bird fig. [*Atrichiidæ*—abnormal *Oscines*], *Secretary-bird fig. [*Serpentariidæ*], *Seriema fig. [*Cariamidæ*], Shearwater, *Sheathbill [*Limicolæ*], Sheld-drake, Shoveler, Shrike. Those marked * are important.

NEWTON, E. T. On the Remains of a Gigantic Species of Bird (*Gastornis klaasseni*, n. sp.), from the Lower-Eocene Beds near Croydon. Tr. Z. S. xii, 6, pls. xxviii & xxix. [*Cf.* Zool. Rec. xxii, *Aves*, p. 61.]

— . Note on the Large Bird from the Eocene of Croydon, found by Mr. H. M. Klaassen. P. Geol. Ass. ix, pp. 349-351.

NICOLSKI, A. M. Material k. poznaniyu phayni pozvonotschnich gevotnich syevero-vostotschnoi Persie e Zakaspüskoi oblacte. Trud. Petersb. xvii, pp. 379-386. Materials towards the Knowledge of the Vertebrate Animal Fauna of the North-East Persian and Trans-Caspian Provinces. [Birds, pp. 386-402.]

He lays emphasis on *Sturnus nobilior*, Hume, and diagnoses a new species, *Otomelu bogdanowi*, Bianchi, q. v.

NIELSEN, P. Ornithologische Beobachtungen zu Eyrarbakki in Island. Ornis, 1886, pp. 429-431. [*Fallus aquaticus* and *Limosa melanura*.]

*NOCARD, —. Sur un Tuberculose zoogléique des Oiseaux de basse-cour. Recueil de Méd. Vétérinaire, May 30th, 1885. [Abstr. in Br. Med. Jour., July 10th, 1885.]

NORGATE, F. [See *Loxia* (*Fringillidae*).]

OETTINGEN, A. v. Einige Beobachtungen über den Instinkt der Vögel. SB. Ges. Dorp. 1885, p. 328.

*OLPHIE-GALLIARD, L. Contributions à la Faune Ornithologique de l'Europe Occidentale. Bayonne: 1886, 8vo; pt. xxxvii, *Gallinæ*; pt. xxxviii, *Tetraonidæ*; pt. xxxix, *Perdiciidæ*; pt. xl, *Cursores*; 94, 68, 74, & 32 pp., respectively. [The author divides in another way at the same time, which is most confusing, viz., into the sub-orders *Gallinæ Craces* (*Meleagridæ*), *Gallinæ Gallinaceæ* (*Pavoninæ*, *Phasianidæ*), *Gallinæ heteromorphæ* (*Numidæ*), *Gallinæ Cursores* (*Tetraonidæ*, *Perdiciidæ*), *Gallinæ Epollicatæ* (*Turnicidæ*, *Pteroclidæ*). These are followed by *Cursores* (*Ædicnemidæ*, *Otididæ*).] Pt. viii, *Anseres Pinnipedes* (*Phalacrocoracidæ*, *Sulidæ*); pt. ix, *Procelariidæ*; pt. x, *Stercorariinæ* = *Larince*; pt. xi, *Sterninæ*; 46, 43, 110, 55 pp., respectively. There appears to be a good deal of change in the generic and specific names of the Birds.

OUSTALET, E. Notice sur quelques Oiseaux nouveaux du Congo, rapportés par les naturalistes attachés à la mission de M. le Comte de Brazza. Le Nat. 1886, pp. 299 & 300.

[See *Centropus savorgnani*, *Coccytes brazzae* (*Cuculidæ*), *Dendropicus pecilei* (*Picidæ*), *Saxicola thalloni*, *Cossypha pecilei* (*Turdidæ*), *Phedina brazzae* (*Hirundinidæ*), n. spp.]

— . Description de quelques oiseaux nouveaux de la Chine [et du Thibet]. T. c. pp. 275 & 276.

See *Tetraophasis desgodinsi*, n. sp. (*Tetraonidæ*).]

[OUSTALET, E.] Catalogue des Oiseaux rapportés par M. G. Révoil de son deuxième voyage aux pays des Çomalis (Afrique orientale). Bibl. haut. Études, xxxi, Art. 10 [1886].

[See *Machæramphus revoili* (Falconidæ), *Pyrrhulauda signata* (Alaudidæ), n. spp.] 73 species in all.

— Notices sur quelques espèces nouvelles ou peu connues de la Collection ornithologique du Museum [N. H. Paris]. N. Arch. Mus. (2) viii (1885) pp. 255–306, pls. xi–xiv.

I. Including *Rheinartius ocellatus*, fig. (Phasianidæ), and a collection of 32 species from Annam [see *Ægithina philipi*, n. sp. (Timeliidæ)].

II. 3 species from New Guinea, the Philippines, and W. Africa [see *Cyclopsittacus salvadorii* (Psittaci), *Ptilopus* (*Rhamphiculus*) *marchii* (Columbidæ), *Numida marchii*, n. sp. (Phasianidæ), pls.].

— Les Flammants. La Nature, 1886, 1^e Semestre, pp. 134–138, pl.

— Les Paradisiens de la Nouvelle-Guinée. T. c. 1^e Semestre, pp. 312–315, pl.

— La Ménéro-Lyro. T. c. 2^e Semestre, pp. 167–170, pl.

— Les Oiseaux voyageurs. Rev. Sci. 1886, pp. 481–492 & 519–526.

— [See also *Psammocrex petiti*, nn. g. & sp. (Rallidæ).]

OWEN, [SIR] R. On *Dinornis* (Part xxv): containing a Description of the Sternum of *Dinornis elephantopus*. Tr. Z. S. xii, 1, pl. i.

PALACKÝ, J. Ueber Wallace's thiergeographische Zonen vom ornithologischen Standpunkt. SB. böhm. Ges. 1885, pp. 243–248.

— Ueber die Selbstständigkeit der australischen Orn. MT. orn. Ver. Wien, 1886, pp. 289–293.

PARKER, H. Notes from Ceylon. Ibis, 1886, pp. 182–188.

Chiefly on the nidification and distribution of species, as a supplement to Legge's Birds of Ceylon.

PARKER, T. J. Notes on a Skeleton of *Notornis*, recently acquired by the Otago University Museum. Tr. N. Z. Inst. 1885 [xviii], pp. 78–82.

PAVESI, P. Intorno ad una rarità ornitologica italiana. [*Bernicla leucopsis*.] Rend. R. Inst. Lomb. xix, pp. 323–326.

PAYNE-GALLWEY, [SIR] R. The Book of Duck Decoys: their Construction, Management, and History. London: 1886, sm. 4to, x & 214 pp., 32 illustr., and frontis.

A full account of Decoys in former and the present time, with plates of them.

PELZELN, A. V. [See FISCHER, F.]

—, & LORENZ, L. V. Typen der ornithologischen Sammlung des k. k. naturhistorischen Hofmuseums. Ann. Nat. Hofmus. 1886, pp. 249–270. [*Rapaces*, *Fissirostres*, *Tenuirostres*]

Besides the types, the author gives a list of "authentic examples," i.e., specimens compared with types by, and received from, the describer of the species.

[PELZELN, A. v., & LORENZ, L. v.] Ueber eine an das k. k. naturhistorische Hofmuseum gelangte Sendung von Vogelbälgen aus Japan. MT. orn. Ver. Wien, 1886, pp. 267-269.

PETIT, L. *Le Cypselus sharpii*. Orn. 1885, pp. 585 & 586.

Nests and eggs ; also young.

——. Note sur l'origine des nids de l'*Hirundo pouchetii*. T. c. pp. 587 & 588.

Nesting in holes in the ground, made by other animals.

PHILLIPS, E. C. Some Further Remarks on the Origin of Domestic Poultry. Orn. 1885, pp. 577-580. [Cf. Zool. Rec. xxi, *Aves*, p. 25.]

PHISALIX, —. [See CHARBONNEL-SALLE, —.]

PICAGLIA, L. Note ornithologique. Atti Soc. Mod. Mem. (Rendic.) 1886, pp. 43, 44, & 148.

——. [See also *Lestris* (*Laridae*).]

PLESKE, T. Uebersicht der Säugethiere und Vögel der Kola-Halbinsel [Russian Lapland]. Theil. II. Vögel und Nachträge. Beitr. Russ. Reiches (2) ix [1886]. 515 pp.

Including notices of the geographical character of the country (in the introduction), of hybrid grouse, &c.

——. Zur Vogelfauna der Insel Ternate. Nach Sammlungen des Dr. Fischer bearbeitet. Mém. Biol. xii, pp. 109-140.

A list, with remarks on colour, of 85 species, all of which, except *Columba intermedia*, are found in Salvadori's Ornith. Pap. et Molucc.

POTTS, T. H. Oology of New Zealand. N. Z. J. Sci. 1885, pp. 222-226, 274-288, 373-378, 475-484, 505-511, & 556-559.

PRZEWALSKI, N. [See *Passer timidus* (*Fringillidae*), *Pyrgilauda barbata* (*Alaudidae*), *Orites calvus* (*Paridae*), n. spp.]

These new species were omitted in Zool. Rec. xxi, *Aves*, p. 25. [Reisen in Tibet, &c.]

RABÉ, F. Catalogue annoté des Oiseaux observés dans l'Yonne, y vivant à l'état sauvage, sédentaires ou n'y étant que de passage. Bull. Soc. Yonne, 1886 [Sci. phys. nat.] pp. 9-72.

Pp. 9-43 include general remarks, under various heads, and a sketch of Degland & Gerbe's systematic arrangement (which the author follows), as well as a table of residents, migrants, &c. Pp. 44-72 contain a list of 272 species, with remarks, also of 31 species not yet observed in the district, but which may be expected to occur.

RADDE, G. Reisen an der Persisch-Russischen Grenze. Talysch und Seine Bewohner. Leipzig : 1886, 8vo, xviii & 450 pp., 4 pls., 12 cuts, map.

——. Die Fauna und Flora des südwestlichen Caspi-gebietes. Wissenschaftliche Beiträge zu den Reisen, &c. [above]. Leipzig: 1886, 8vo, viii & 425 pp., 3 pls. [not of Birds].

The Birds are contained in pp. 12-30. [See *Accentor ocellaris*, n. sp. (*Sylviidae*), and *Porphyrio*, in Zool. Rec. xxi, *Aves*, p. 26.]

RADE, E. Die Entenfänge in dem Moorheiden von Hopsten. JB. westf. Ver. 1885, p. 31.

RAGAZZI, V. [See CARRUCCIO, A.]

RAMSAY, E. P. Notices on the Migration of Birds in Australia. Ornith. 1885, pp. 581-584.

There is no "migration" in Australia; birds are merely "nomadic," changing their quarters irregularly at times.

RAMSAY, R. G. W. Contributions to the Ornithology of the Philippine Islands. No. 2. On Additional Collections of Birds. Ibis, 1886, pp. 155-162. [Cf. Zool. Rec. xxi, Aves, p. 34.]

[See *Hierococcyx bocki*, n. sp., *H. hyperythrus* (Cuculidae), *Cyornis herioti*, n. sp. (Muscicapidae), *Mirafra philippinensis*, n. sp. (Alaudidae), *Porzana tabuensis* (Rallidae), *Pericrocotus novus*, n. sp. (Campophagidae).]

——. [See also *Copsychus niger*, n. sp. (Turdidae).]

RAVN, E. Ueber die mesodermfreie Stelle in der Keimscheibe des Hühnereimbryos. Arch. Anat. Phys. 1886, pp. 412-420, pl. xxi.

REICHENOW, A. Monographio der Gattung *Ploceus*. Zool. JB. i (1886), pp. 113-164, pl. v.

See *Ploceidae* for figs., and *P. heuglini*, *P. reichardi*, n. spp.

——. Handwörterbuch der Zoologie, Anthropologie, und Ethnologie. Bd. iv. Breslau: 1886, 8vo, 640 pp. [*Halithea-Landrace*.]

——. Ueber die Begrenzung der zoogeographischen Regionen vom Ornithologischen Standpunkt. Tag. Deut. Nat. Vers. 1886, pp. 195 & 196.

——. Neue Gedanken über zoogeographische Regionen. J. f. O. 1886, pp. 549-551.

——. [See also *Hyphantica æthiopica* n. var. *intermedia*, *Habropyga polioogastra* (Ploceidae), *Lusciola böhmii* (Sylviidae), *Crateropus tangericæ* (Timaliidae), *Cypselus nyochrous* (Cypselidae), *Lobivanellus superciliosus* (Charadriidae), n. spp.]

——, & SCHALOW, H. Compendium der neu beschriebenen Gattungen und Arten. Series viii [1883, continued]. T. c. pp. 81-114 & 436-452. [Cf. Zool. Rec. xxii, Aves, p. 25.]

REISCHEK, A. Ornithologische Beobachtungen aus Neu-Seeland. MT. orn. Ver. Wien, 1886, pp. 109-112.

Notes on *Oreadion cinereus*, *Procellaria cookii*, *P. gouldi*, *P. parkinsoni*, and *Puffinus assimilis*, especially as to their breeding.

——. Notes on New Zealand Ornithology. Tr. N. Z. Inst. 1885, pp. 84-107.

Nearly same as last paper. See *Pogonornis cincta* (Meliphagidae), *Puffinus gavius* (Procellariidae), besides the above.

RETERER, M. Des glandes et des lymphatiques dans la constitution de la Bourse de Fabricius. C.R. c. p. 810.

The subjects are *Uria troile*, *Pigeon commun*, *Poule*, &c.

REYES Y PROSPER, V. DE LOS. Catálogo de las *Aves* de España, Portugal, é Islas Baleares. An. Soc. Esp. xv, pp. 5-109.

A terse list of 408 species [with localities and native names], 22 of which are N. African stragglers, 4 are Asiatic stragglers, and 1 American. The author describes the country, and divides it into seven zones. He gives notes on *Falco fuliginosus* and *Porphyrio variegatus*, in conclusion.

RIDGWAY, R. A Nomenclature of Colours for Naturalists, and Compendium of Useful Knowledge for Ornithologists. Boston: 1886, 8vo, 129 pp., 10 col. pls., 7 outline illust.

Pt. i is a full account of the use of colours and their names. Pt. ii contains a glossary of technical terms in descriptive ornithology, table for converting English inches into millimetres, and the reverse process.

— . Descriptions of Two New Species of Birds, supposed to be from the Interior of Venezuela. Auk, iii, p. 333.

[See *Pyroderus masoni* (Cotingidæ), *Aulacorhamphus dimidiatus* (Rhamphastidæ), n. spp. Cf. also P. U. S. Nat. Mus. 1886, pp. 92-94 (where notes are added on the young and adult of *Myiopsitta lincolni*).]

— . Preliminary Descriptions of some New Species of Birds from Southern Mexico, in the Collection of the Mexican Geographical and Exploring Commission. T. c. pp. 331-333.

[See *Amphispiza ferrariperezi*, *Pipilo submaculatus*, *P. complexus* (Fringillidæ), *Anas diazi* (Anatidæ), *Philortyx personatus* (Phasianidæ), n. spp.]

— . On a New Species of the Genus *Empidonax* from Guatemala. On *Empidonax fuscatus* and *Empidonax brunneus*. On the Species of the Genus *Empidonax*. Ibis, 1886, pp. 459-468.

The new species is *E. salvini*, q. v.

— . [See also *Lawrenciu* (Tyrannidæ), *Pealea* (Procellariidæ), n. gg.]

— . [See also *Geothlypis coryi*, *G. tanneri* (Mniotiltidæ), *Myiarchus coalii* (Tyrannidæ), *Micrathene graysoni* (Striges), *Hæmatopus galapagensis* (Charadriidæ), *Larus barrovianus* (Lariidæ), *Centurus nyeanus*, *C. blakii*, *Picolaptes rikeri* (Picidæ), n. spp., *Cyclorhis flavi-ventris yucatanensis*, n. subsp. (Vireonidæ).

— . [See also *Plectrophenax* (Fringillidæ), *Buteo* (Falconidæ), *Tringa* (Scolopacidæ), *Æstreolata* (Procellariidæ), *Colinus* (Phasianidæ), *Dryobates* (Picidæ).]

RIVES, W. C. Notes on Birds of the Salt Pond Mountain, Virginia. Auk, iii, pp. 156-161.

RIVIÈRE, E. Faune des Oiseaux trouvés dans les Grottes de Menton (Italie). C.R. ciii, pp. 944-946.

ROCHAS, F. Sur quelques particularités relatives aux connexions des ganglions cervicaux du grand sympathique et à la distribution de leurs rameaux afférents et efférents chez l'*Anas boscas*. C.R. c, pp. 649-651

- [ROCHAS, F.] De l'existence, chez les Oiseaux, d'une série de ganglions céphaliques, de nature sympathique, correspondant aux nerfs craniens segmentaires. *Op. cit.* cii, pp. 1028-1031.
- ROCHEBRUNE, A. T. [See *Cinnyris scapulatus*, n. sp. (*Nectariniidæ*).]
- ROGERON, G. Croisements de Canards (printemps 1885). *Bull. Soc. Acclim.* 1886, pp. 308-312. [*Cf.* *Zool. Rec.* xxii, *Aves*, p. 26.]
- . Sur la mue des Canards. *T. c.* pp. 544-549.
The author affirms the double annual moult of both male and female, and gives reasons for it (wear and tear, courting dress, &c.).
- ROMITA, V. DE. Avifauna Pugliese. Catalogo sistematico degli Uccelli osservati in Puglia. Bari: 1884, 8vo, xi & 138 pp.
- ROMITI, G. De l'extrémité antérieure de la corde dorsale et de son rapport avec la poche hypophysaire ou de Rathke chez l'embryon du poulet. *Arch. Ital. Biol.* vii, pp. 226-231.
- RUSS, K. Die fremdländischen Stubenvögel, ihre Naturgeschichte, Pflege, und Zucht. Vol. iv, pt. 7, pp. 657-784. Magdeburg: 1886, 8vo. [*Cf.* *Zool. Rec.* xxii, *Aves*, p. 26.]
- . Vögel der Heimat. Leipzig: 1886, 8vo, pts. 1-9, pp. 1-272, pls. i-iv, vi-viii, x, xi, xiii, xiv, xvi, xvii, xxi, xxii, xxiv, xxvii, xxix, xxxi, & xxxviii.
- SALVADORI, T. On some Papuan, Moluccan, and Sulu Birds. *Ibis*, 1886, pp. 151-155.
Remarks, by way of correction, on a paper by Nehr Korn [*cf.* *Zool. Rec.* xxii, *Aves*, p. 23], and on Guillemard's "Cruise of the 'Marchesa.'" [See *Graucalus guillemardi*, n. sp. (*Campophagidæ*).]
- SALVIN, O. A List of the Birds obtained by Mr. Henry Whitely in British Guiana. *Ibis*, 1886, pp. 57-78, 168-181, & 499-510, pl. xii. [*Cf.* *Zool. Rec.* xxii, *Aves*, p. 27.]
- [See *Aulacorhamphus* (*Rhamphastidæ*), *Psittacula* (*Psittaci*), *Buteo* (*Falconidæ*).] In the third of the above articles an account is given of Birds from Tweek-quay, one of the Roraima range of mountains. Also summary and conclusions. [See *Eucometis oleaginea*, n. sp. (*Tanagridæ*), *Pipreola whitelyi* ♂ [new to science], ♀, pls. (*Cotingidæ*), *Phoniopara* (*Fringillidæ*).]
- . [See also GODMAN, F. D.]
- SAUNDERS, H. On the Birds obtained by Mr. G. C. Bourne on the Island of Diego Garcia, Chagos Group. *P. Z. S.* 1886, pp. 335-337.
Sterna bernsteini, *S. melanauchen*, *Foudia madagascariensis* are the rarest species.
- . Ornithology in the Colonial and Indian Exhibition. *Ibis*, 1886, pp. 468-471.
- . [See also *Fuligula* (*Anatidæ*), *Sterna* (*Laridæ*).]

SCHALOW, H. Der ornithologische Nachlass Dr. Richard Böhm's. I. Die Tagebücher Dr. R. Böhm's. J. f. O. 1886, pp. 409-436.

A large number of species are chronicled from the west of L. Tanganyika, none of which are stated to be new, but several are marked ?. The eggs of *Hirundo puella*, *Cosmetornis vexillaris*, *Uræginthus* sp.?, *Urobrachya axillaris*, and *Pyromelana flammiceps* were found. *Passer swainsoni* was also breeding.

—. [See also REICHENOW, A., and *Musophagidæ*.]

SCHEIDEMANTEL, G. Der Stammbaum unserer Vögel. Monat. Schutze Vogelw. 1886, pp. 232-240.

Remarks on the origin of Birds, with a genealogical tree.

SCHIAVUZZI, B. [See *Otis* (*Otididæ*).]

*SCHUPERCK, F. Rossiya dailnayo vostoka. Being vol. xiv of the Zapinski of the Imp. Russ. Geogr. Soc. Petersb. (1885).

On the Birds of the Amur; containing new species, apparently without descriptions.

SCLATER, P. L. Catalogue of the Passeriformes, or Perching Birds, in the Collection of the British Museum; *Fringilliformes*: Part II, containing the Families *Certhidæ*, *Tanagridæ*, and *Icteridæ*; vol. xi of the series. London: 1886, 8vo, 431 pp., 18 pls.

Containing in the Introduction an important discussion on the systematic position of the above families, in which the author advocates a position for *Icteridæ* after *Fringillidæ* and near *Sturnidæ*. He considers *Tanagridæ* nearly allied to *Certhidæ* and *Mniotiltidæ* on the one side, and to *Fringillidæ* on the other. For the plates, see the respective families. The Salvin-Godman and Sclater collections have made a most important series of additions to these families.

—. On the Claws and Spurs of Birds' Wings. Ibis, 1886, pp. 147-151, 300 & 301, 4 cuts.

After mentioning misstatements of Selenka and Owen, and partly of Nitzsch, the author states that the spurs are of quite a different origin from the claws, the former only having any use in the adult Bird, viz., that of offence, and that the claws are remnants of nails. The species considered are *Gypagus papa*, *Chauna derbiana*, *Plectropterus gambensis*, and *Parra jacana*.

—. List of a Collection of Birds from the Province of Tarapacá, Northern Chili. P. Z. S. 1886, pp. 395-404, pl. xxxvi, map, 2 cuts.

A very important paper on 53 species of Birds, no less than 20 of which are new to Chili, though only 7 are new to Peru, of which Tarapacá lately formed a part. Notes on the eggs of various species are given. [See *Phanicopterus jamesi*, n. sp., *P. andinus* (*Phanicopteredæ*), *Oreotrochilus* (*Trochilidæ*), *Bolborhynchus* (*Psittaci*), *Vanellus*, *Ægialitis* (*Charadriidæ*).]

—. On Interesting Objects [including Birds] noticed in the Zoological Gardens of Rotterdam, Amsterdam, Cologne, Antwerp, and Ghent. P. Z. S. 1886, p. 320.

[SCLATER, P. L.] On an Apparently New Parrot of the Genus *Conurus* living in the Society's Gardens. *T. c.* pp. 538 & 539, pl. lvi.

[See *Conurus rubritorquis*, n. sp. (*Psittaci*).]

—. Description of a New Ground-Finch from Western Peru. *Ibis*, 1886, pp. 258 & 259, pl. viii.

[See *Hæmophila pulchra*, n. sp. (*Fringillidæ*).]

—. [See also *Bubo* (*Striges*), *Tadorna* (*Anatidæ*).]

SCOTT, W. E. D. On the Avifauna of Pinal Co., with Remarks on some Birds of Pima and Gila Cos, Arizona. *Auk*, iii, pp. 249-258, 383-389, & 421-432, map.

These articles [with notes by J. A. Allen] refer to the country near Tucson, Florence, Riverside, the Santa Catalinas, and Mineral Creek.

[See *Dryobates*, *Melanerpes* (*Picidæ*), *Iache* (*Trochilidæ*), *Geococcyx* (*Cuculidæ*).]

—. See also *Aphelocoma* (*Corvidæ*), *Peucaea* (*Fringillidæ*), *Lophophanes* (*Paridæ*).]

SEEBOIM, H. Notes on the Birds of the Upper Engadine. *Ibis*, 1886, pp. 24-29.

—. A Review of the Species of the Genus *Cursorius*. *T. c.* pp. 115-121 [with a key].

—. A Review of the Species of the Genus *Scelopax*. *T. c.* pp. 122-144.

Two important articles, giving the differences between species at great length.

—. A Review of the Species of the Genus *Himantopus*. *T. c.* pp. 224-237.

A lengthy account [with a key] of the above. The author considers that the *Charadriidæ* are all descendants of one species, which lived before the close of the glacial period.

—. A Review of the Species of the Genus *Numenius*. *Zool.* 1886, pp. 137-148.

9 species and 2 varieties are discussed, with their diagnostic points and probable lines of migration from an original common source.

—. On the Genus *Hæmatopus*. *T. c.* pp. 41-49.

An account of 9 species of the above, suggestions as to their differentiation, and lines of flight from the original head-quarters of the race.

—. [See also *Saxicola* (*Turdidæ*), *Anser* (*Anatidæ*), *Phasianus* (*Phasianidæ*), *Larus* (*Laridæ*).]

SEIDEL, —. [See MIDDENDORF, E. v.]

SERVICE, R. [See *Pyrhonorax* (*Corvidæ*).]

SETON, E. E. T. The Birds of Western Manitoba. *Auk*, iii, pp. 145-156 & 320-329.

259 species and varieties.

THOMPSON, E. E. Addenda. *T. c.* p. 453.

The latter is the author's real name.

1886. [VOL. XXIII.]

SHARPE, R. B. On a Collection of Birds from Fao, in the Persian Gulf. With Notes by the Collector, W. D. Cumming. *Ibis*, 1886, pp. 475-493.

[See *Hypocolius* (*Laniidae*).]

—. On a Collection of Birds from the Vicinity of Muscat. *T. c.* pp. 162-168.

[See *Bubo milesi* (*Striges*), *Merops muscatensis* (*Meropidae*), n. spp., *Alcedo* (*Alcedinidae*).]

—. On a Collection of Birds from Bushire, in the Persian Gulf. *T. c.* pp. 493-499.

—. Notes on the Specimens in the Hume Collection of Birds. No. I. On the Hawfinch from Attock. *P. Z. S.* 1886, pp. 96 & 97. No. II. On some Rosefinches, p. 353. No. III. On *Lalage melanothorax*, p. 354. No. IV. On some Flycatchers of the Genus *Siphia*, p. 354.

[See *Coccothraustes humii*, *Carpodacus severtzovi*, n. spp., *Propasser* (*Fringillidae*), *Lalage* (*Campophagidae*), *Siphia* (*Muscicapidae*).]

—. Notes on some Birds from Perak. *T. c.* pp. 350-353.

The species from the Mountains of Malacca are partly Sumatran, partly Himalayan. Two are recorded, hitherto considered peculiar to Sumatra. [See *Psilopogon* (*Capitonidae*), *Rhinocichla* (*Muscicapidae*).]

—. [See also GOULD, J. [the late], YERBURY, J. W., and *Pyrrhula kurilensis*, n. sp. (*Fringillidae*).]

—, & WYATT, C. W. A Monograph of the *Hirundinidae*, or Family of Swallows. London: 1886, 4to, pts. iii & iv, pp. discount., 12 pls. [*Cf.* *Zool. Rec.* xxii, *Aves*, p. 29.]

For species figured see the Family.

SHELLEY, G. E. A Review of the Species of the Family *Ploceidae* of the Ethiopian Region. Part I. *Viduinæ*. *Ibis*, 1886, pp. 301-359, pl. ix.

An elaborate paper on the Family, which the author divides into two subfamilies, the *Viduinæ* and *Ploceinæ*, distinguished by the shape of the bastard primary. He gives keys to the genera and species, with full synonymy of each. [See *Estrela atricapilla*, pl., *Pyromelana aurea*, pl., *Vidua verreauxi*.]

SHUFELDT, R. W. Feathered Forms of other Days. The Century Illustrated Monthly Magazine (New York & London), xxxi, No. 3 [Jan., 1886], pp. 352-365, cuts.

The author figures *Archaeopteryx* [2 slabs and an imaginary restoration], *Hesperornis regalis* [skeleton and restoration], *Ichthyornis victor* [skeleton], *Palapteryx*, *Didus ineptus*, *Leguatia gigantea*, *Somateria labradori*, *Alca impennis*. He makes the head and body of *Archaeopteryx* naked, whereas, no doubt the feathers had been abraded, together with the skin, by the action of the waves before the fossil stage, except those most deeply seated.

[SHUFFELDT, R. W.] Additional Notes upon the Anatomy of the *Trochili*, *Caprimulgi*, and *Cypselidæ*. P. Z. S. 1886, pp. 501-503, pl. [Cf. Zool. Rec. xxii, *Aves*, p. 30.]

Correction of an error in pl. lxi, fig. 3; the humeri of the above forms re-drawn.

—. [Note] on the Free Post-pubis in certain of the *Falconidæ*. Auk, iii, pp. 133 & 134.

—. On an Old Portrait of Audubon, painted by himself, and a word about some of his Early Drawings. T. c. pp. 417-420, pl.

The latter are of Magpie, Coot, and Green Woodpecker.

—. Osteological Note upon the Young of *Geococcyx californianus*. J. Anat. Phys. xxi, pp. 101 & 102.

The proximal extremity of the tibio-tarsal shaft is even more bulky than usual in this young bird, as compared with the adult, and a separate epiphysis represents the future antero-superior part. Further material is required to determine whether the intermedium develops as a separate ossicle.

—. The Skeleton in *Geococcyx*. J. Anat. Phys. xx, pp. 244-266, pls. vii-ix.

A full description of the skeleton.

—. Osteology of *Conurus carolinensis*. T. c. pp. 407-425, pls. x & xi.

Description and synopsis of characters.

—. Contributions to the Anatomy of *Geococcyx californianus*. P. Z. S. 1886, pp. 466-491, pls. xlii-xlv.

In continuation of the foregoing paper on the same subject, the author gives an exhaustive account of this Bird, which must be left to the anatomist to study. It cannot be shortly analysed usefully. The deductions as to the relationship of *Geococcyx* will be found on p. 489. He differs from F. E. Beddard [cf. Zool. Rec. xxii, *Aves*, p. 50] in separating *Crotophaga* from the *Centropodineæ*.

—. On Injuries of the Beak in Birds, and the Method of Repair. J. Comp. Med. 1886, pp. 357-359, cut.

Treats of a beautifully-healed upper mandible [of a raven].

—. Outlines for a Museum of Anatomy, prepared for the Bureau of Education. Washington: 1886, 8vo, 65 pp.

SIMSON, F. B. Letters on Sport in Eastern Bengal. London: 1886, 4to, xvii & 255 pp., 10 pls.

SLATER, H. H., & CARTER, T. Notes from Northern Iceland in the Summer of 1885. Ibis, 1886, pp. 45-52.

[See *Linota* (*Fringillidæ*), *Calidris* (*Scolopacidæ*).]

—, & —. Field Notes [in the Breeding Season] from Northern Iceland. Zool. 1886, pp. 149-159.

The authors found nests of most of the well-known Icelandic species, and what they believed to be that of the Sanderling. They obtained a

series of skins and eggs of the Ptarmigan of the Island. Practically the same paper as the last.

SMART, G. Birds on the British List: their title to enrolment considered. London: 1886, 8vo, xxiv & 148 pp.

The author was fortunate to obtain "from the fen-men" British specimens of the egg of the Oystercatcher, Kite [Harrier?], and Norfolk Plover (p. xx).

SMITH, H. G. Some Additions to the Avifauna of Colorado. Auk, iii, pp. 284-286 [10 species].

SMITH, W. W. On Moa and other Remains from the Tengawai River, Canterbury. N. Z. J. Sci. 1885, pp. 293-295.

—. [See also *Ocydromus* (*Rallidae*).]

SOUSA, J. A. DE. Lista das aves colligidas em Africa de 1884 a 1885 pelos srs. Capello e Ivens. J. Sci. Lisb. 1886, pp. 76-81. [32 species.]

—. Additamento à lista das aves. T. c. pp. 151-153. [11 species.]

—. Lista das aves colligidas pelo sr. Serpa Pinto no Ibo [E. Africa] em 1885. T. c. pp. 82-85. [23 species.]

—. Aves de Angola. T. c. pp. 154-170. [92 species.]

[See *Barbatula bocagii* (*Capitonidae*), *Bradyornis benguellensis* (*Dicru-ride*), n. spp.] The above were collected by J. de Anchieta.

SOUTHWELL, T. [See GURNEY, J. H. (JUNR.).]

STEJNEGER, L. Review of Japanese Birds.

I. The Woodpeckers. P. U. S. Nat. Mus. 1886, pp. 99-124, pl. ii.

The author gives a detailed account of each species, with keys to the order, families, and species. [See *Picus canus yessoensis*, n. subsp., *Dryobates subcirris*, *D. namiyei*, pl., n. spp. (*Picidae*).]

II. Tits and Nuthatches. T. c. pp. 374-394.

Keys as before, &c. The author proposes a new generic name, *Remiza*, for the Penduline Titmice [p. 387]. [See *Sitta amurensis clara*, n. subsp. (*Sittidae*).]

III. Rails, Gallinules, and Coots. T. c. pp. 395-408.

Keys as before, &c

—. On a Collection of Birds made by Mr. M. Namiye, in the Liu Kiu Islands, Japan, with Descriptions of New Species. T. c. pp. 634-651.

[See *Treron permagna* (*Columbidae*), *Hypsipetes pryeri* (*Pycnonotidae*), *Chelidon namiyei* (*Hirundinidae*), *Pericrocotus tegimae* (*Campophagidae*), n. spp., *Ictoturus namiyei*, nn. g. & sp. (*Timeliidae*), *Megascops* (*Striges*), *Turnix* (*Turnicidae*).]

—. [See also *Charitonetta*, n. g. (*Anatidae*), *Cuculus peninsulae*, n. sp. (*Cuculidae*), omitted in Zool. Rec. xxii, *Aves*, p. 30.]

—. [See also *Parus palustris dresseri*, n. subsp. (*Paridae*), *Pardalotus* (*Laniidae*), *Turdus* (*Turdidae*), *Rallus* (*Rallidae*), *Brachyrhamphus*, pl., *Synthliborhamphus* (*Alcidae*).]

STERNDALE, R. A. [See AITKEN, E. H.]

STEWART, L. C. Natural History and Sport in the Himalayas. Zool. 1886, pp. 286-294, 319-325, 393-409, & 431-448. [See *Mirafra*, n. sp.? (*Alaudidae*), *Emberiza stewarti*, n. sp.? fig. by Gould as *caniceps*.]

An interesting paper, with notes of habits and nesting of a large number of species.

——. Ornithologische Notizen auf dem Wege von Calcutta nach Allahabad. MT. orn. Ver. Wien, 1886, pp. 20, 21, 67, 68, 77, & 78.

SUNDEVAL, C. J. On the Wings of Birds. Ibis, 1886, pp. 389-457, pls. x & xi.

A translation from the Swedish in "Kongl. Vetensk.-Akad. Handlingar," 1843.

SUNDMAN, G. Finska Fögel-ägg. Tecknade af Gösta Sundman. Helsingfors: [no dates, received by Brit. Mus. Libr. 1886]. Pt. vi. *Picidae*, *Columbidae*, *Colymbidae*, *Laridae*, *Podicipedidae*, *Alcidae*. Pt. vii. *Paridae*, *Motacillidae*, *Certhiidae*, *Sylviidae*, *Laniidae*, *Muscicapidae*, *Turdidae*.

This work is simply the continuation of "Finnische Vögeleier," the German version having been stopped. No text was received with the above parts; it is probably only continued in Finnish, if at all.

SUNDSTRÖM, C. R. Verzeichniss der Vögel Schwedens. Ornis, 1886, pp. 289-301.

SUTTON, J. B. Avian Tuberculosis: an Illustration of Amœbic Warfare. J. Comp. Med. 1886, pp. 329-357, pl. ii, cuts.

The author states the newly-ascertained fact that the bacillus in avian tuberculosis is identical with that in the human subject. He says that the disease is almost peculiar to graminivorous and fruit-eating birds and vegetable feeders; that the *Gallinæ* and *Columbæ* are especially liable to it; and that the alimentary canal (by way of which the bacilli are introduced) and the associated viscera are almost exclusively affected, being studded with nodules; also that the disease originates in the mucous coat of the bowels. An account follows of the structure of the nodules and of the character of the bacilli (which are distributed by the blood-vessels). The leucocytes war against the bacilli; the disease is therefore a battle between the former and the irritant particles, the characteristic nodules being regarded as the field of battle. In conclusion, the contamination of the birds' food by stale fæces, &c., is the probable cause of the production of the bacilli, in connection with which is the fact that similar nodules are found on parrots' feet. It may be proved hereafter that tuberculosis is communicated to man by the lower animals.

SWAINSON, C. Provincial Names and Folk Lore of British Birds. [Publ. for the English Dialect Soc.] London: 1885, 8vo, 243 pp.

Re-published as The Folk Lore and Provincial Names of British Birds [Publ. for the Folk Lore Soc., 1886.]

SWINBURNE, S. Notes on Birds observed on various Voyages between England and the Cape of Good Hope. (Communicated by J. J. Dalgleish.) P. Phys. Soc. Edinb., 1885-86, pp. 193-201.

No remarks of great importance.

TACZANOWSKI, L. Ornithologie du Pérou. Rennes : 1886, 8vo, vol. iii (completing the work), 522 pp., map, supplement. [*Cf.* Zool. Rec. xxi, *Aves*, p. 32.]

The author treats of the families *Fringillidæ*, *Picidæ* [see *Picumnus punctifrons*, n. sp., *Chloronerpes callonotus peruvianus*, n. subsp.], *Alcedinidæ*, *Momotidæ*, *Galbulidæ*, *Bucconidæ*, *Cupitonidæ*, *Rhamphastidæ*, *Trogonidæ*, *Cuculidæ*, *Psittacidæ*, *Columbidæ*, *Opisthocomidæ*, *Cracidæ*, *Thino-coridæ*, *Tetraonidæ*, *Tinamidæ* [see *Crypturus rubripes*, *Nothoprocta godmani*, n. spp.], *Rallidæ* [see *Rallus peruvianus*, n. sp.], *Parridæ*, *Ædicnemidæ*, *Charadriidæ*, *Scolopacidæ*, *Psophiidæ*, *Aramidæ*, *Eurypygidæ*, *Ardeidæ*, *Ciconiidæ*, *Platalæidæ*, *Tantalidæ*, *Phænicopteridæ*, *Pelecanidæ*, *Fregatidæ*, *Phalacrocoracidæ*, *Sulidæ*, *Plotidæ*, *Phaethontidæ*, *Laridæ*, *Procellariidæ*, *Anatidæ*, *Heliornithidæ*, *Podicipedidæ*, *Aptenodytidæ*, *Rheidæ*.

— . Liste des Oiseaux reçus récemment du sud-ouest du pays Oussourien. Bull. Soc. Z. Fr. 1885, pp. 463-478.

Vultur monachus, *Cotile riparia sinensis*, *Regulus cristatus japonicus*, *Larvivora sibilans*, *Pacilia palustris crassirostris* [new form (*Paridæ*)], *Buphus coromandus* are new to Eastern Siberia. The birds were collected by Jankowski & Kalinowski at Sidemi, for the most part; a few came from Wladiwostok.

— . Liste supplémentaire des Oiseaux recueillis dans le sud-ouest du pays Oussourien. *Op. cit.* 1886, pp. 305-310.

40 species from Sidemi not in the former list, and 3 entirely new to those parts.

— . [See also *Anas* (*Anatidæ*).]

TRISTRAM, H. B. On the Species of the Genus *Plotus*, and their Distribution. Ibis, 1886, pp. 41-43, pl. iii. [See *Plotus levaillanti* (*Ploceidæ*).]

— . On an apparently New Species of Duck from the Central Pacific. P. Z. S. 1886, pp. 79 & 80, pl. vii.

[See *Dafila modesta*, sp. n. (*Anatidæ*).]

TROIS, E. F. [See *Phænicopterus* (*Phænicopteridæ*).]

TROUESSART, — . Sur la présence de Ricins dans le tuyau des plumes des Oiseaux. C.R. ciii, pp. 165-167.

TSCHUSI ZU SCHMIDHOFFEN, V. V. I. Nachtrag zu meiner Schrift : "Die Vögel Salzburg's." Z. ges. Orn. 1886, pp. 225-251.

An appendix to a book published in 1877. It contains 72 species.

— . Die ornithologische Literatur österreich-ungarns 1886. T. c. pp. 271-282. [*Cf.* Zool. Rec. xxii, *Aves*, p. 32.]

[Tschusi zu Schmidhoffen, V. v.] Beiträge zur Geschichte der Ornithologie in Oesterreich-Ungarn. MT. orn. Ver. Wien, 1886, pp. 73-77, 87, 88 [Siebenbürgen.], & 219-222 [Mähren].

—. [See also DALLA TORRE, K. v., and *Anthus (Motacillidae)*, *Ruticilla (Sylviidae)*.]

ULM-ERBACH [BARONIN]. Falkenjagd in Japan. MT. orn. Ver. Wien, 1886, pp. 114-117, cuts.

USSHER, R. J. Bird-Life on the Saltees and the Keraghs, co. Wexford. Zool. 1886, pp. 88-98.

—. Breeding of the Fork-tailed Petrel on the Blasquets, co. Kerry. T. c. pp. 367 & 368.

VALLON, G. Note sull' Avifauna del Friuli. Boll. Soc. Adr. 1886, pp. 166-217.

A list of 240 species certainly, and 28 others probably, found in the district. Prefatory remarks on the geographical position of the area, &c., are given.

VIAN, J. Monographie des Poussins des Oiseaux d'Europe qui naissent vêtus de duvet (*Ptilopædes*, Sundevall). Bull. Soc. Z. Fr. 1886, pp. 340-419.

The writer recommends the practice of collecting and mounting the young in down, as they need comparison to determine the species. He diagnoses and describes those of the families *Tetraonidae*, *Phasianidae*, *Otididae*, *Edicnemidae*, *Charadriidae*, *Scolopacidae*, *Rallidae*, *Gruidae*, *Ardeidae*, *Ciconiidae*, *Plataleidae*, *Ibididae*, *Phænicopteridae*.

—. [See also *Phyllopneuste (Sylviidae)*.]

VORDERMAN, A. G. Oproeping aan alle vogelkenners en Vogelliefhebbers in Nederlandsch Indië. Tijdschr. Nederl. Ind. xlv, pp. 525-540.

On stations for observing Bird migration.

—. Bijdrage tot de Kennis van de Avifauna der Preanger Regentschappen Längs de Wijnkoopersbaai (West-Java). Op. cit. xlv, Af. 1.

WALTER, A. [See *Cuculus (Cuculidae)*.]

WARDER, R. H. On the Destruction of Native Birds. J. Cincinn. Soc. (1886) ix, p. 179.

WARYNSKI, S. Sur la production artificielle des Monstres à cœur double chez les poulets. Rec. Z. Suisse, 1886, pp. 261-312, pl. xvi & cut.

WASHINGTON, S. v. Deutsche Vulgarnamen der Vögel Steiermarks. MT. orn. Ver. Wien, 1886, pp. 278-283.

WELLS, J. G. A Catalogue of the Birds of Grenada, West Indies, with Observations thereon. [Edited by G. N. LAWRENCE.] P. U. S. Nat. Mus. 1886, pp. 609-632.

Interesting notes on the Birds and their breeding. *Regerhinus uncinatus* is new to the Antilles; *Zenaida rubripes* and *Engyptila wellsi* are well-known recent discoveries in this island. [Auk, i, p. 180; ii, p. 357.]

WELLS, J. W. Exploring and Travelling Three Thousand Miles through Brazil from Rio de Janeiro to Maranhão. London : 1886, 8vo, 2 vols., xix & 411, xii & 386 pp., maps and pls.

Many notices of Birds.

WHITE, T. Remarks on the Feathers of Two-Species of Moa. Tr. N. Z. Inst. 1885, pp. 83 & 84, pls. ii & iii.

WIJHE, J. W. v. Ueber Somiten und Nerven im Kopfe von Vögel- und Reptilienembryonen. Zool. Anz. 1886, pp. 657-660.

WOLSCHEKE, O. [See *Anas* (*Anatide*).]

WOODWARD, H. On "Flightless Birds," commonly called "Wingless Birds," Fossil and Recent ; and a few words on Birds as a Class. P. Geol. Ass. ix, pp. 352-376, pls. i & ii, cuts, append. [*Cf.* Zool. Rec. xxii, *Aves*, p. 33.]

A statement of the views held by different authorities, with remarks. No new ideas are advanced.

WÜSTNEI, C. Ornithologische Mittheilungen aus der Umgegend von Schwerin. Arch. Ver. Mecklenb. 1885, pp. 21-40.

A list of 103 species.

WYATT, C. W. [See SHARPE, R. B.]

YERBURY, J. W. On the Birds of Aden and the Neighbourhood. With Notes by R. BOWDLER SHARPE. Ibis, 1886, pp. 11-24, map.

[See *Cotile* (*Hirundinide*), *Merops muscatensis*, n. sp. (*Meropide*), *Terpsiphone* (*Muscicapide*).]

YOUNG, J. Heronry on the Danube [near Hirsova]. Tr. Norw. Soc. 1886, pp. 170-173.

ZAROUDNOÏ, M. Oiseaux de la contrée Transcaspienne. Bull. Soc. Mosc. 1885, No 2.

The Birds of the Oasis Ahal-Téké, between the Kopepète-Dagh Mountains and the desert of Kara-Koum. The preface is by M. MENZBIER.

CARINATÆ.

PASSERES.

OLIGOMYODI.

COTINGIDÆ.

Pipreola whitelyi ♂ [new to science] and ♀ figured ; O. Salvin, Ibis, 1886, p. 502, pl. xii.

Pyroderus masoni, n. sp., Venezuela ; R. Ridgway, P. U. S. Nat. Mus. 1886, p. 92, & Auk, iii, p. 333.

PIPRIDÆ.

Pipra dubia, n. sp., figured, *loc. incert.* [e. K. K. zool.-anthrop. Mus. Dresden]; J. v. Madarász, Z. ges. Orn. 1886, p. 270, pl. ix.

TYRANNIDÆ.

Lawrencia, g. n. (type *Empidonax nanus*, Lawr.); R. Ridgway, Auk, iii, p. 382.

Myiarchus coalii, n. sp., probably from Orinoco; *id.* P. U. S. Nat. Mus. 1886, p. 520. *M. denigratus*, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 500.

Oncostoma olivaceum new to Colombia [and S. America]; H. v. Berlepsch, Ibis, 1886, p. 57.

Empidochanes fuscatus (Max.) and *Empidonax brunneus*, Ridg., are distinct species; *Empidochanes vireoninus*, n. sp.?, Tobago; R. Ridgway, t. c. pp. 460 & 461.

Empidonax, on the species of the genus; *id.* t. c. pp. 461-468. *E. salvini*, n. sp., near *E. bairdi*, Calderas, Volcan de Fuego, Guatemala; *id.* t. c. p. 459. *E. flaviventris difficilis*, nests on ledges of rock on Upper Pecos river; H. W. Henshaw, Auk, iii, p. 75.

TRACHEOPHONÆ.

DENDROCOLAPTIDÆ.

Furnarius, its breeding, &c.; E. A. Göldi, Zool. Gart. 1886, pp. 265-274, cuts.

Xenerpestes minlosi, nn. g. & sp., Bucaramanga, U.S. Colombia; H. v. Berlepsch, Ibis, 1886, p. 55.

ACROMYODI.

PSEUDOSCINES.

ATRICHIDÆ.

Abnormal *Oscines*, *sub voce* "Scrub-bird," fig.; A. Newton, Encycl. Brit. ed. 9, vol. xxi.

OSCINES.

ALAUDIDÆ.

Galerita cristata figured; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. clxxxi.

Mirafra philippinensis, n. sp., Manilla; R. G. W. Ramsay, Ibis, 1886, p. 160. *Mirafra* n. sp.?, Simla; L. C. Stewart, Zool. 1886, p. 290.

Pyrgilauda barbata, n. sp., Burchan Budda, N. Tibet ; N. Przewalski, Reisen in Tibet, pp. 112 & 116 [omitted in Zool. Rec. xxi, *Aves*, p. 25].

Pyrrhulauda signata, n. sp.?, near *P. affinis*, Somaliland ; E. Oustalet, Bibl. haut. Études, xxxi, art. 10, p. 9.

CAMPOPHAGIDÆ.

Edoliisoma poliopse figured ; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxii.

Graucalus guillemardi, n. sp. [= *Artamides pollens*, cf. Zool. Rec. xxii, *Aves*, p. 36] ; T. Salvadori, Ibis, 1886, p. 154.

Lalage leucopygialis is specifically distinct from *L. terat*, freshly coloured garb of the male never correctly described before ; W. Blasius, Z. ges. Orn. 1886, pp. 112, 178, & 179. *L. melanothorax* [cf. Sharpe, Cat. Birds B. Mus. iv, p. 91] is a made-up specimen, and must be cancelled ; R. B. Sharpe, P. Z. S. 1886, p. 354.

Pericrocotus lansbergei, n. sp., Bima, Sumbawa ; J. Büttikofer, Notes Leyd. Mus. viii [1886], p. 156. *P. novus*, n. sp., Isabella, N. Luzon ; R. G. W. Ramsay, Ibis, 1886, p. 161. *P. tegimæ*, n. sp., Okinawa Shima, Liu-kiu Is. ; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 648.

CEREBIDÆ.

Certhiola atrata is perhaps a melanotic *C. saccharina* ; C. B. Cory [ex Ridgway], Auk, iii, p. 53. *C. dominicana* figured from the type ; P. L. Selater, Cat. Birds Brit. Mus. xi, p. 44, pl. v, fig. 2. *C. finschi*, Ridgw., is probably a phase of plumage of *C. martinica* ; C. B. Cory, Auk, iii, p. 53. *C. martinica* figured ; P. L. Selater, Cat. Birds Brit. Mus. xi, p. 46, pl. v, fig. 1. *C. sharpii*, n. sp., I. of Grand Cayman, W.I. ; C. B. Cory, Auk, iii, p. 497. *C. sundevalli*, Ridgw., is probably a phase of plumage of *C. dominicana* ; *id. t. c.* p. 52.

Chlorophanes atricapilla, the specimens recorded from Cuba are possibly escaped cage birds ; *id. t. c.* p. 55. *C. purpurascens* ♂ figured from type ; P. L. Selater, Cat. Birds Brit. Mus. xi, p. 31, pl. iv.

Conirostrum fraseri ♂ figured from type ; *id. t. c.* p. 15, pl. ii, fig. 1.

Dacnis concolor ♂, *D. salmoni* ♀, figured from types ; *id. t. c.* pp. 21 & 27, pl. iii, fig. i, & pl. ii, fig. 2.

Diglossa mystacalis figured ; *id. t. c.* p. 6, pl. i.

CORVIDÆ.

Figures of various species ; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pls. cccxxii, cccxxiv, cccxxv, cccxxvii, & cccxxix.

Apelocoma insularis, n. sp., Santa Cruz I., California ; H. W. Henshaw, Auk, iii, p. 452. *A. sieberi arizonæ*, curious facts about its breeding ; W. E. D. Scott, *t. c.* pp. 81-83.

Corvus corax, *sub voce* "Raven" ; A. Newton, Encycl. Brit. ed. 9, vol. xx. *C. frugilegus*, *sub voce* "Rook" ; *id. ibid.* *C. scapulatus*, skeleton

figured ; A. B. Meyer, Abbild. Vogel-skel. pl. x : its nest ; E. Hartert, J. f. O. 1886, p. 587.

Pyrrhonorax graculus, disappearance from Kirkcudbright ; R. Service, Tr. N. H. Soc. Glasg. 1884-85, pp. 117-122.

DICAIDÆ.

Dicaeum nehrkorni, n. sp., Runukan, N. Celebes ; W. Blasius, Braunsch. Anzeiger vom 3rd März, 1886 [see J. f. O. 1886, p. 399]. *D. pectorale* figured ; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxi.

DICRUROIDÆ.

Bradyornis benguellensis, n. sp., near *B. murinus*, Benguella ; J. A. do Sousa, J. Sci. Lisb. 1886, p. 160 [cf. J. v. Barboza d. Bocage, *op. cit.* 1882, p. 293].

FRINGILLIDÆ.

Figures of various species ; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pls. clxxxix, cxc, & ccv ; E. T. Booth, Rough Notes, &c., pts. x & xii.

Acanthis, additional notes on genus ; W. E. Brooks, Ibis, 1886, pp. 359-364.

Ammodromus petenicus figured ; F. D. Godman & O. Salvin, Biol. Centr. Amer., *Aves*, p. 385, pl. xxviii, fig. 2.

Amphispiza ferrariperezi, n. sp., Chietla, State of Puebla, Mexico ; R. Ridgway, Auk, iii, p. 332 : full description ; F. Ferrari-Perez, P. U. S. Nat. Mus. 1886, p. 143.

Carduelis spinus figured ; E. T. Booth, Rough Notes, &c., pt. xii.

Carpodacus severtzovi, n. sp., Turkestan and Yarkand, must be separated from *C. rubicillus* from Caucasus ; R. B. Sharpe, P. Z. S. 1886, p. 353.

Ohrysomitris forreri, n. sp., Ciudad, in Durango, Mexico ; F. D. Godman & O. Salvin, Biol. Centr. Amer., *Aves*, p. 429. *C. atriceps*, *C. xanthogastra*, figured ; *iid.* t. c. pp. 429 & 430, pls. xxxi, figs. 1-3.

Ooccothraustes humii, n. sp., Attock, Punjab ; R. B. Sharpe, P. Z. S. 1886, p. 96.

Cyanospiza rosita figured ; F. D. Godman & O. Salvin, Biol. Centr. Amer. *Aves*, p. 362, pl. xxv.

Emberiza stewarti, n. sp., Koteghur, Himalayas ; L. C. Stewart, Zool. 1886, p. 435. *E. melanocephala* in Notts ; J. R. Ashworth, t. c. p. 73.

Hæmophila lawrencii, n. sp. [= *H. ruficauda*, Lawr., Bull. U. S. Nat. Mus., No. 4, p. 22], Juchitan, near Tehuantepec, Mexico ; F. D. Godman & O. Salvin, Biol. Centr. Amer., *Aves*, p. 397. *H. pulchra*, n. sp., Matucana, Upper Rimac Valley, W. Peru ; P. L. Sclater, Ibis, 1886, pp. 258 & 259, pl. viii. *H. humeralis*, *H. rufescens*, *H. superciliosa*, *H. ruficauda* figured ; F. D. Godman & O. Salvin, Biol. Centr. Amer., *Aves*, pp. 394-396 & 398, pls. xxix, figs. 1 & 2, & xxx, figs. 1 & 2.

- Haplospiza uniformis* figured ; *iid. t. c.* p. 366, pl. xxvii, fig. 1.
- Hesperiphona vespertina*, osteology [see HERRICK, C. L.].
- Junco hyemalis carolinensis*, n. subsp., Highlands and Black Mt., N. Carolina ; W. Brewster, Auk, iii, p. 108. *J. alticola* figured ; F. D. Godman & O. Salvin, Biol. Centr. Amer., *Aves*, p. 374, pl. xxvi, fig. 1.
- Linota linaria* considered to be the species which breeds in Iceland ; H. H. Slater & T. Carter, Ibis, 1886, p. 47.
- Loxia curvirostra*, two if not three pairs nesting in Suffolk ; F. Norgate, Tr. Norw. Soc. 1886, p. 163. *L. c. stricklandi* in Kansas ; L. L. Dyche, Auk, iii, pp. 258-261 [with a table of measurements of 40 specimens]. *L. pityopsittacus*, its nest and eggs ; W. Meves, Ornith., 1886, p. 190 : probably breeding in Perthshire, N.B. ; J. G. Millais, P. Perthsh. Soc. 1884-85, p. 182.
- Loxigilla richardsoni*, *L. barbadensis*, n. spp., Mts. of Sta Lucia, W.I., and Barbadoes respectively ; C. B. Cory, Auk, iii, p. 382.
- Passer brancoensis*, n. sp., Cape de Verde Is. ; E. Oustalet, Ann. Sci. Nat. xvi [1883], Art. 5. *P. timidus*, n. sp., Schui-go R., and Ala-schan ; N. Przewalski, Reisen in Tibet, pp. 64 & 253 [omitted in Zool. Rec. xxi, *Aves*, p. 25]. *P. pyrrhonotus* on Lake Manchar, Sind ; E. F. Becher, Zool. 1886, p. 430. *P. domesticus* figured.
- Peucaea notosticta* figured ; F. D. Godman & O. Salvin, Biol. Centr. Amer., *Aves*, p. 393, pl. xxviii, fig. 1. *P. ruficeps boucardi*, description of nest and eggs—it breeds thrice a year ; W. E. D. Scott, Auk, iii, p. 83.
- Phonipara fumosa* [*phaeoptila*] = *Amaurospiza unicolor*, Cab. ; O. Salvin, Ibis, 1886, p. 502.
- Pipilo submaculatus*, *P. complexus*, n. spp., Tezuitlan, State of Puebla, Mexico ; R. Ridgway, Auk, iii, p. 332 : fuller account ; F. Ferrari-Perez, P. U. S. Nat. Mus. 1886, pp. 146 & 147.
- Plectrophanes nivalis* probably breeds on the Scur Mòr of Fannich, Gairloch ; J. H. Dixon, Gairloch, p. 245. [It has since been found breeding (1886) in Assynt, and will be recorded in next volume of Zool. Rec.]
- Plectrophenax hyperboreus*, a breeding place discovered to be Hall I., Bering Sea ; R. Ridgway, Auk, iii, p. 276.
- Polioptila flegeli*, n. sp., Loko, W. Africa ; E. Hartert, J. f. O. 1886, p. 583.
- Propasser grandis*, Blyth, is distinct from *P. rhodochlamys*, Brandt ; the former is from the Himalayas, the latter from Yarkand ; *P. rhodometopus*, Biddulph, is Brandt's *P. rhodochlamys* ; R. B. Sharpe, P. Z. S. 1886, p. 353.
- Pyrrhula kurilensis*, n. sp., Kurile Is. ; *id.* Zool. 1886, p. 485. [E. coll. B. Mus. et H. Seebohm.]
- Spizella pusilla arenacea*, n. var., Laredo, S. Texas ; A. P. Chadbourne, Auk, iii, p. 248. *S. pinetorum* figured ; F. D. Godman & O. Salvin, Biol. Centr. Amer., *Aves*, p. 378, pl. xxvii, fig. 3.
- Zonotrichia vulcani*, *Z. quinquestriata*, figured ; *iid. t. c.* pp. 368 & 371, pls. xxvi, fig. 2, & xxvii, fig. 2.

HIRUNDINIDÆ.

Chelidon namiyei, n. sp., Urassoimagiri, Okinawa Shima, Liu-Kiu Is.; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 646. *C. urbica* figured; Lord Lilford, Col. Fig. of Br. Birds, pt. iii.

Cotile riparia figured; *id. ibid.* *C. concolor*, *C. obsoleta*, figured; R. B. Sharpe & C. W. Wyatt, Monogr. Hirund. pt. iv. *C. obsoleta* breeding at Aden; J. W. Yerbury, Ibis, 1886, p. 14.

Hirundo smithii, *H. nigrorufa*, *H. cucullata*, *H. atrocaerulea*, *H. melano-crissa*, *H. griseopyga*, *H. nigrita*, figured; R. B. Sharpe & C. W. Wyatt, Monogr. Hirund. pts. iii & iv. *H. poucheti* nesting in holes (made by other animals) in the ground; L. Petit, Orn. 1885, p. 587. *H. gutturalis* is distinct from *H. rustica*, its colours during and after change of plumage; W. Blasius, Z. ges. Orn. 1886, pp. 108 & 178. *H. rustica* figured; Lord Lilford, Col. Fig. of Br. Birds, pt. iii.

Petrochelidon ariel figured; R. B. Sharpe & C. W. Wyatt, Monogr. Hirund. pt. iv.

Phedina brazzæ, n. sp., near *P. borbonica*, Ganciu (Nganciou) Congo; E. Oustalet, Le Nat. 1886, p. 300.

Psalidoprocne holomelana, *P. pristoptera*, figured; R. B. Sharpe & C. W. Wyatt, Monogr. Hirund. pt. iii.

ICTERIDÆ.

Icterus bairdi, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 500. *I. hawaiielli* figured from type; P. L. Selater, Cat. Birds Brit. Mus. xi, p. 377, pl. xviii.

Ostinops guatemozinus figured; F. D. Godman & O. Salvin, Biol. Centr. Amer. p. 439, pl. xxxii.

Quiscalus caymanensis, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 499.

LANIIDÆ.

Dryoscopus bicolor, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. x.

Fraseria ocreata, its nest and eggs, from Liberia; J. Büttikofer, Notes Leyd. Mus. viii [1886], p. 257.

Hypocolius ampelinus, its nests and eggs; R. B. Sharpe [W. D. Cumming], Ibis, 1886, pp. 477-480.

Lanius, *sub voce*, "Shrike"; A. Newton, Encycl. Brit. ed. 9, vol. xxi. *L. algeriensis* in Alsace; H. Schallow, J. f. O. 1886, p. 123. *L. excubitor* and *L. major*, their specific rank doubtful, connecting forms seem to show they are synonymous, as also may be the case with other nearly allied forms; R. Collett, Ibis, 1886, pp. 30-40.

Otomela bogdanowi, n. sp., Aber, Astrabad, N. Persia; A. M. Nicol-ski, Trud. Petersb. xvii, pp. 392 & 394-396 [diagnosis—comparison with *O. romanowi* and *E. collurio*]; also V. Bianchi, Bull. Pétersb. xxx, pp. 514-519.

Pachycephala collaris figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxi.

Pardalotus ornatus, *P. assimilis*, *P. affinis*, and allied species, intergradation, &c.; L. Stejneger, P. U. S. Nat. Mus. 1886, pp. 294-296.

MELIPHAGIDÆ.

Euthyrhyncha fulvigula from Hufeisen Mts., compared with specimen from Arfak Mts.; A. B. Meyer, Z. ges. Orn. 1886, p. 181.

Meliarchus sclateri figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pl. xxi.

Melidectes emilii, n. sp., near *M. torquatus*, Hufeisen Mts., New Guinea; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 22, pl. iv, fig. 2.

Melioptes fumigatus, n. sp., near *M. gymnops*, Hufeisen Mts., New Guinea; *id.* t. c. p. 22, pl. iv, fig. 1.

Melirrhophetes batesi, n. sp., figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxii. [See also R. B. Sharpe, Nature, xxxiv (1886), p. 340.]

Myzomela ramsayi, n. sp. (Finsch in lit.), near *M. nigrita*, New Ireland, Kapaterong and Nusa; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 21.

Pogonornis cincta, its breeding; A. Reischek, Tr. N. Z. Inst. 1885, p. 84.

Ptilotis fulvocinerea, n. sp., near *P. unicolor*, Hufeisen Mts., New Guinea; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 24, pl. v, fig. 1.

Stigmatops kebirensis, *S. squamata*, figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxi.

Xanthotis chrysotis figured; *id.* *ibid.* *X. rubiensis*, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. x.

MNIOTILTIDÆ.

Dendroæa vitellina, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 497.

Geothlypis coryi, n. sp., Eleuthera I., Bahamas; R. Ridgway, t. c. p. 334. *G. tanneri*, n. sp., Abaco I., Bahamas; *id.* t. c. p. 335.

Helminthophila lawrencii × *H. pinus*, a curious hybrid; W. Brewster, Auk, iii, p. 411.

Helonæa swainsoni, its nest and eggs; *id.* Ibis, 1886, pp. 4-11 [cf. Zool. Rec. xxii, *Aves*, p. 40].

MOTACILLIDÆ.

Agrodroma campestris figured; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. clxxv.

Anthus cervinus in the Salzburg district; V. v. Tschusi zu Schmidhoffen, MT. orn. Ver. Wien, 1886, pp. 265-267. *A. ricardi*, shot near Perth, N.B.; J. G. Millais, Zool. 1886, p. 26. *A. pratensis* figured; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. clxxi.

Motacilla alba in East Lothian in April and May; W. Evans, P. Phys. Soc. Edinb. 1885-86, p. 186: new to Madeira; W. Hartwig; J. f. O. 1886, p. 456.

MUSCICAPIDÆ.

Arses henkii, n. sp., ♂ near *A. aruensis*, ♀ near *A. telescopthalma*, Astrolabe Mts., New Guinea; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 16, pl. iii, figs. 1 & 2. *A. telescopthalma*, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. x.

Cyornis albo-olivacea, Hume, = *Setaria pectoralis*, Salvad., = *Rhinomyias pectoralis*, Sharpe; R. B. Sharpe, P. Z. S. 1886, p. 354. *C. herioti*, n. sp., Manilla; R. G. W. Ramsay, Ibis, 1886, p. 159.

Dioptrornis brunnea, *D. fischeri*, ♀ ad. and ♀ juv. figured; A. Reichenow, J. f. O. 1886, pl. i, figs. 1-3.

Erythromyias riedeli, n. sp., Tenimber Is.; J. Büttikofer, Notes Leyd. Mus. viii [1886], pp. 62 & 63, pl. iii, fig. 1. *E. pyrrhonota* figured; *id.* t. c. pl. iii, fig. 2.

Monarcha chalybeocephalus, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. x.

Pseudogerygone cinereiceps, n. sp., *P. chrysogastra*, figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxii [see also for the former R. B. Sharpe, Nature, xxxiv (1886), p. 340]. *P. notata* = *Leptotodus tenuis* from Amberbaki, New Guinea [cf. Zool. Rec. xxi, Aves, p. 41], figured; *id.* t. c. p. xxi.

Rhinocichla mitrata from Malacca Mts.; R. B. Sharpe, P. Z. S. 1886, p. 352.

Rhipidura cinnamomea, n. sp., Hufeisen Mts., New Guinea; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 17, pl. iii, fig. 3. *R. rubro-frontata*, *R. hyperythra*, figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pts. xxi & xxii.

Siphia poliogenys = *S. cacharensis*, Madarász [cf. Zool. Rec. xxi, Aves, p. 42]; R. B. Sharpe, P. Z. S. 1886, p. 354.

Terpsiphone cristata new to Arabia; *id.* [in note], Ibis, 1886, p. 16.

NECTARINIIDÆ.

Cinnyris n. sp.?, from Liberia; J. Büttikofer, Notes Leyd. Mus. viii [1886], p. 250. *C. cupreus*, its eggs, &c.; E. Hartert, J. f. O. 1886, p. 580 [Kutter]. *C. scapulatus*, sp. n., Gaboon; A. T. de Rochebrune, Bull. Soc. Philom. (1885) ix, p. 89. *C. venustus*, a correction; J. Büttikofer, Notes Leyd. Mus. viii (1886), p. 250.

ORIOOLIDÆ.

Oriolus galbula figured; E. T. Booth, Rough Notes, &c., pt. xiii.

PARADISEIDÆ.

Paradiseide?, sub voce "Riflebird"; A. Newton, Encycl. Brit. ed. 9, vol. xx.

Amblyornis subalaris figured [cf. Zool. Rec. xxii, Aves, p. 42]; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxii.

Drepanornis bruijnii figured; *id. op. cit.* pt. xxi.

Lophorina [superba] minor, the "neck-collar" is wrongly drawn in the pl. (xvii) in last year's volume, it is here redescribed; A. B. Meyer, Z. ges. Orn. 1886, p. 180, cut [*cf.* Zool. Rec. xxii, *Aves*, p. 42].

Paradisornis rudolphi figured; O. Finsch & A. B. Meyer, Ibis, 1886, pl. vii [*cf.* Zool. Rec. xxii, *Aves*, p. 42]; A. B. Meyer, Monat. Schutze Vogelw. 1886, pp. 85-88, pl.

Rhipidornis guillemi-tertii, a fourth specimen possibly from New Guinea itself and not Wagiau; *id.* P. Z. S. 1886, p. 297. [Note that 2 former specimens, ♂ ♀, are at Amsterdam.]

PARIDÆ.

Cyanistes cæruleus figured; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. xci.

Lophophanes wolweberi, its nest and eggs; W. E. D. Scott, Auk, iii, p. 48.

Orites calvus, n. sp., Balekun-gomi, Yellow River; N. Przewalski, Reisen in Tibet, p. 199 [omitted in Zool. Rec. xxi, *Aves*, p. 25].

Parus griseiventris figured; A. Reichenow, J. f. O. 1886, pl. ii, fig. 1 [description, 1882, p. 210]. *P. palustris dresseri*, n. subsp. [= British Marsh Tit]; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 200.

Pæcilia palustris crassirostris, form. nov., Sidemi, Ussuria; L. Taczanowski, Bull. Soc. Z. Fr. 1886, p. 470.

Psaltiriparus melanotis = *P. helviventris*, Cab.; F. Ferrari-Perez, P. U. S. Nat. Mus. 1886, p. 134.

Remiza, n. g. for Penduline Tits; L. Stejneger, *t. c.* p. 387.

PLOCEIDÆ.

Donacicola hunsteini, n. sp., figured, N. New Ireland; O. Finsch, Ibis, 1886, p. 1, pl. i.

Estrela atricapilla figured; G. E. Shelley, *t. c.* p. 330, pl. ix, fig. 1.

Euplectes franciscanus, its eggs; E. Hartert, J. f. O. 1886, p. 585 [Kutter]. *E. nigrifrons* figured; A. Reichenow, *t. c.* pl. ii, fig. 2 [described, 1884, p. 177].

Fouldia madagascariensis introduced? in Diego Garcia, Chagos Group; H. Saunders, P. Z. S. 1886, p. 335.

Habropyga poliogastra, n. sp., near *H. incana*, Sund. (*natalensis*, Cab.), Inhambane, Mosambique; A. Reichenow, J. f. O. 1886, p. 121.

Hyphantica, g., and *H. æthiopica*, n. var. *intermedia*, E. Africa [Fischer, Hildebrandt, Böhm]; A. Reichenow, J. f. O. 1886, pp. 391-394.

Hyphantornis sp.?, Angola; J. A. de Sousa, J. Sci. Lisb. 1886, p. 166.

Lagonosticta nitidula, n. sp., Tanganyika; G. Hartlaub, Bull. Mus. Belg. iv, p. 145, pl. iv, fig. 2.

Ploceus xanthops, *P. sakalova*, *P. dimidiatus*, *P. subpersonatus*, figured; A. Reichenow, Zool. Jahrbücher, Bd. i [1886], pp. 113-164, pl. v, figs. 1-4. *P. duboisi*, sp. n., Tanganyika; G. Hartlaub, Bull. Mus. Belg. iv, p. 144,

pl. iv, fig. 1. *P. heuglini*, n. sp., = *Textor atrogularis*, v. Heugl.; A. Reichenow, Zool. Jahrbücher, Bd. i [1886], p. 147. *P. reichardi*, n. sp., Karema, Tanganyika; *id. t. c.* p. 151: figured; *id. J. f. O.* 1886, pl. ii, fig. 3.

Pyromelana aurea figured; G. E. Shelley, Ibis, 1886, p. 354, pl. ix, fig. 2.

Spermospiza hematina, its nest and eggs from Liberia; J. Büttikofer, Notes Leyd. Mus. viii [1886], p. 260.

Vidua verreauxi, its specific rank cancelled; G. E. Shelley, Ibis, 1886, p. 340.

PYCNONOTIDÆ.

Hypsipetes pryeri, n. sp., Napa, Okinawa Shima, Liu-Kiu Is.; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 642.

Phyllornis jerdoni, Tickell's account of its mimicry confirmed; E. H. Aitken, J. Bomb. Soc. 1886, p. 28.

SITTIDÆ.

Sitta amurensis clara, n. subsp., Yesso; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 392.

STURNIDÆ.

Calornis feadensis figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxi. *C. neglecta*, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. x.

Creadion cinereus, notes on the species and its breeding; A. Reischek, MT. orn. Ver. Wien, 1886, p. 109.

Melanopyrrhus anais, *M. orientalis*, figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxii.

Sturnia violacea, colours during and after change of plumage; W. Blasius, Z. ges. Orn. 1886, p. 120.

SYLVIIDÆ.

Figures of various species; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pls. lxxxv, cxxvi, cxxvii bis, cxxix, cxxx, clxi, & clxi bis.

Accentor ocularis, n. sp., near *A. fulvescens*; G. Radde, Fauna und Flora Casp. Gebiet, p. 19.

Acrocephalus turdoides, *A. luscinioides*, *A. streperus*, *A. palustris*, *A. phragmitis*, figured; Lord Lilford, Col. Fig. of Br. Birds, pts. ii & iii. *A. orientalis*, difference from *A. stentoreus* confirmed; W. Blasius, Z. ges. Orn. 1886, p. 178.

Cyanecula suecica, *C. leucocyana*, figured; Lord Lilford, Col. Fig. of Br. Birds, pt. ii.

Erithacus rubecula, *sub voce* "Redbreast"; A. Newton, Encycl. Brit. ed. 9, vol. xx: figured; E. T. Booth, Rough Notes, &c. pt. x.

Hypolais icterina figured; Lord Lilford, Col. Fig. of Br. Birds, pt. iii. *Locustella luscinioides*, *L. fluviatilis*, notes on; S. Faszl, MT. orn. Ver. Wien, 1886, pp. 303, 304, & 316-318.

Lusciola böhmii, n. sp., near *L. philomela*, Marungu, E. Africa; A. Reichenow, J. f. O. 1886, p. 115.

Myiadestes armillatus, true habitat unknown [Vieill. gives Martinique], it may be a known species poorly described; C. B. Cory, Auk, iii, p. 14.

Phyllopneuste, Asiatic species taken in Heligoland; J. Vian, Bull. Soc. Z. Fr. 1886, pp. 652-670.

Phylloscopus borealis new to Europe; W. Meves, Ornith., 1886, p. 223: its breeding habits, &c., in Norway; R. Collett, Ibis, 1886, pp. 217-223. *P. sibilatrix* figured; Lord Lilford, Col. Fig. of Br. Birds, pt. iii. *P. superciliosus*, Sumburgh Head Lighthouse, Shetland; J. A. Harvie-Brown, P. Phys. Soc. Edinb. 1885-86, p. 298, & Zool. 1886, p. 487.

Regulus calendula, remarks on its plumage; C. W. Beckham, P. U. S. Nat. Mus. 1885, pp. 625-628.

Ruticilla, sub voce "Redstart"; A. Newton, Encycl. Brit. ed. 9, vol. xx. *R. phoenicurus*, examples of females in the partial dress of the male, which is often, not always, due to sterility; the entrance of the oviduct is found on dissection to be turned inwards, and is hence useless; one of these birds, however, paired with a male; V. v. Tschusi zu Schmidhoffen, Z. ges. Orn. 1886, pp. 219-222, pl. viii: female in plumage of male, with remarks on similar instances in other species; J. H. Gurney, Jun., Tr. Norw. Soc. 1886, pp. 182-185.

Sylvia curruca, *S. hortensis*, figured; Lord Lilford, Col. Fig. of Br. Birds, pt. ii.

Sylvietta stamptii, n. sp., Monrovia, Liberia; J. Büttikofer, Notes Leyd. Mus. viii [1886], p. 252.

TANAGRIDÆ.

Chlorophonia flavirostris, *Euphonia concinna*, ♂ ♀, *E. finschi*, ♂, *E. melanura*, ♂ ♀, *E. vittata*, *Nemosia albigularis*, ♂ ♀, *Thlypopsis ornata*, ♂, *Buarremon leucopsis*, *B. comptus*, *Arremon wuchereri*, figured from types; P. L. Selater, Cat. Birds Brit. Mus. xi, pls. vi-xvii.

Chlorophonia roraimæ, ♂, *Euphonia saturata*, *Phænicothraupis gutturalis*, *Thlypopsis inornata*, ♂, *Buarremon tricolor* figured; *id. t. c.* pls. vi, viii, xi, xiii, & xvi.

Eucometis oleaginea, n. sp., Tweek-quay Mt., Carimang R., Br. Guiana; O. Salvin, Ibis, 1886, p. 500.

Spindalis salvini, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 499.

TIMELIIDÆ.

Ægithina philipi, n. sp., Hue, Annam; E. Oustalet, N. Arch. Mus. (2) viii [1885], p. 285.

Crateropus tangericæ, n. sp., figured, Qua Mpara (Marungu), E. Africa; A. Reichenow, J. f. O. 1886, p. 115, pl. iii, fig. 1.

Drymæca sp. ? [from Angola]; J. A. de Sousa, J. Sci. Lisb. 1886, p. 164. *D. amphilecta*?, *D. superciliosa*?, their eggs; E. Hartert, J. f. O. 1886, pp. 578 & 579 [Kutter].

Icoturus namiyei, n. g. & sp., Nagogatake, Liu-Kiu Is. ; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 645.

Trochalopterus cinnamomeum, n. sp., near *T. cachinnans* ; W. Davison, Ibis, 1886, p. 204. [Prob. from the Palghat Hills, India.]

Xenocichla eximia, its nest and eggs from Liberia ; J. Büttikofer, Notes Leyd. Mus. viii. [1886], p. 255.

TROGLODYTIDÆ.

Thryothorus guadeloupensis, n. sp., Grand Terre, Guadeloupe ; C. B. Cory, Auk, iii, p. 381.

Troglodytes hirtensis is not a good species ; H. E. Dresser, Ibis, 1886, pp. 43-45 [cf. Zo ol. Rec. xxii, *Aves*, p. 45].

TURDIDÆ.

Copsychus niger, n. sp., Elopura, N.E. Borneo ; R. G. W. Ramsay. P. Z. S. 1886, p. 123.

Cossypha pecilei, n. sp., near *C. emerina*, Ganciu (Nganciou), Congo ; E. Oustalet, Le Nat. 1886, p. 300.

Harporhynchus crissalis, *H. leontii*, *H. curvirostris palmeri*, *H. bendirii*, measurements, habits, nests, and eggs ; E. A. Mearns, Auk, iii, pp. 289-307.

Merula erythrotis, n. sp., near *M. similima* ; W. Davison, Ibis, 1886, p. 205.

Mimocichla raveda, n. sp., I. of Grand Cayman, W.I. ; C. B. Cory, Auk, iii, p. 499. *M. schistacea* is probably distinct from *M. rubripes* ; *id. t. c.* p. 6.

Mimus bahamensis, Bryant, = *M. gundlachi*, Gundlach ; *id. t. c.* p. 22.

Monticola solitarius, colours during and after change of plumage ; W. Blasius, Z. ges. Orn. 1886, p. 99.

Myiophoneus tibetanus, n. sp., Tibet ; J. v. Madarász, Ibis, 1886, p. 145.

Pratincola rubetra, *P. rubicola*, figured ; Lord Lilford, Col. Fig. of Br. Birds, pt. ii.

Saxicola thalloni, n. sp., near *S. arnotti*, Lékéti, Congo ; E. Oustalet, Le Nat. 1886, p. 300. *S. stapazina*, *S. melanoleuca*, synonymy, &c. ; H. Seebohm, Zool. 1886, pp. 193-195. *S. deserti*, first occurrence in England ; W. E. Clarke, Ibis, 1886, p. 100 : figured ; Lord Lilford, Col. Fig. of Br. Birds, pt. ii.

Turdus stormsi, n. sp., Tanganyika ; G. Hartlaub, Bull. Mus. Belg. iv, p. 143, pl. iii. *T. alpestris* (Brehm.) is a distinct species from *T. torquatus* ; L. Stejneger, P. U. S. Nat. Mus. 1886, pp. 365-373. *T. bocagii*, exhibition of a specimen from L. Tanganyika confirming the species ; J. Cabanis, J. f. O. 1886, p. 397 [cf. Zool. Rec. xix, *Aves*, p. 26, *sub voce* *Peliocichla*. *T. pilaris*, *T. iliacus*, *T. musicus*, figured ; K. T. Liebe, Monat. Schutze Vogelw. 1886, pp. 4, 30, & 310, 3 pls. *T. iliacus*, *sub voce* "Redwing" ; A. Newton, Encycl. Brit. ed. 9, vol. xx. *T. musicus* figured ; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. cxiv. *T. torquatus* figured ; E. T. Booth, Rough Notes, pt. xi.

VIREONIDÆ.

Cyclorhis flaviventris yucatanensis, n. subsp., Merida, Yucatan; R. Ridgway, P. U. S. Nat. Mus. 1886, p. 519.

Vireo alleni, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 500. *V. solitarius alticola*, n. subsp., N. Carolina [mts. of western part]; W. Brewster, t. c. p. 111.

PICARIÆ.

PICIDÆ.

Centurus caymanensis, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 499. *C. nyeanus*, n. sp., Watling's I., Bahamas; R. Ridgway, t. c. p. 336. *C. blakei*, n. sp., Abaco I., Bahamas; *id.* t. c. p. 337. *C. striatus*, note on; A. B. Meyer, Gefiederte Welt, 1886, p. 253.

Chloronerpes callonotus peruvianus, n. subsp., Chepen Tumbez, Guajango, Guadalupe, Moropen, Province de Piura; L. Taczanowski, Orn. du Pérou, iii, p. 80.

Chrysophlegma squamicolle is the correct name for *C. mentalis* from Malacca [not Java]; E. Hargitt, Ibis, 1886, pp. 260 & 269.

Colaptes gundlachi, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 498.

Dendropicus peculei, sp. n., near *D. schoensis*, Diele, Congo; E. Oustalet, Le Nat. 1886, p. 299.

Dryobates namiyei, n. sp. [= *Picus leuconotus*, Blakiston & Pryer (part)], Hondo I., Japan; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 116, pl. ii. *D. nuttallii* × *D. pubescens gairdnerii*, a probable hybrid; R. Ridgway, P. U. S. Nat. Mus. 1886, p. 521. *D. stricklandi* [arizonæ], notes on the young; W. E. D. Scott & J. A. Allen, Auk, iii, p. 426. *D. subcirris*, n. sp. [= *P. leuconotus*, Blakiston], Hondo I. and Yesso, Japan; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 113.

Gecinus flavirostris, n. sp., near *G. virilis*, Murgab R., Transcaspiian Province; M. Menzbier, Bull. Mosc. 1886, p. 439.

Melanerpes torquatus, notes on the young; W. E. D. Scott & J. A. Allen, Auk, iii, p. 427.

Picolaptes rikeri, n. sp., Diamantina, Santarem, Lower Amazons; R. Ridgway, P. U. S. Nat. Mus. 1886, p. 523.

Picumnus punctifrons, n. sp., Monterico, Huambo, Peru; L. Taczanowski, Orn. du Pérou, iii, p. 65, = *P. aurifrons* [Tacz.].

Picus arizonæ, n. sp., near *P. stricklandi*, Santa Rita Mts., Arizona; E. Hargitt, Ibis, 1886, p. 112. *P. canus yessoensis*, n. subsp., Yesso, Japan; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 106 [= *G. canus*, of Blakiston]. *P. major* figured; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. xlv.

Yungipicus gymnophthalmus, its eggs; H. Parker, Ibis, 1886, p. 183.

TROCHILIDÆ.

Iache latirostris, W. E. Scott & J. A. Allen, Auk, iii, p. 432.

Oreotrochilus leucopleurus, nest and eggs; P. L. Sclater, P. Z. S. 1886, p. 398.

Selasphorus platycercus, the males start for their winter quarters immediately the young leave the nest (about Aug. 10th), the females and young following later; H. W. Henshaw, Auk, iii, p. 75 [He gives supposed reasons for this]. *S. platycercus*, *S. rufus*, food plant [a *Scrophularia*] and habits. *S. calliope*, rarity ? of females; *id. t. c.* pp. 75-78.

CYPSELIDÆ.

Chatura, its affinities; F. A. Lucas, Auk, iii, pp. 444-451 [anatomy]. *C. gaumeri* [cf. Zool. Rec. xix, *Aves*, p. 36], specific rank confirmed; G. N. Lawrence, Ann. N. York Ac. iv. p. 273. *C. peregrinator*, n. sp., Temax, Yucatan; *id. op. cit.* iii, p. 273. *C. poliura*, probably new to West Indies; C. B. Cory, Ibis, 1886, p. 473.

Cypselus melba figured; Lord Lilford, Col. Fig. of Br. Birds, pt. iii. *C. myochrous*, n. sp., Karema, E. Africa; A. Reichenow, J. f. O. 1886, p. 116. *C. sharpii*, nests, eggs, and young; L. Petit, Ornis, 1885, p. 585.

CAPRIMULGIDÆ.

Caprimulgidæ, structure of syrinx, visceral anatomy, myology; F. E. Beddard, P. Z. S. 1886, pp. 147-153, 3 cuts.

Egotheles wallacii figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxi.

Scotornis longicaudus, its eggs; E. Hartert, J. f. O. 1886, p. 592 [Kutter].

COLIIDÆ.

Colius nigricollis, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. x.

ALCEDINIDÆ.

Alcedo bengalensis = *A. ispida*; R. B. Sharpe, Ibis, 1886, p. 166.

Ceryle stictipennis, n. sp., Guadeloupe, W.I.; G. N. Lawrence, P. U. S. Nat. Mus. 1885, p. 623; C. B. Cory, Auk, iii, p. 367.

Ceyx gentiana figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxii.

BUCEROTIDÆ.

Anthracoceros coronatus, its eggs; H. Parker, Ibis, 1886, p. 184.

UPUPIDÆ.

Upupa epops figured; E. T. Booth, Rough Notes, &c., pt. xiii.

MEROPIDÆ.

Nyctiornis amictus, *N. athertoni*, *Meropogon forsteni*, *Merops breweri*, *M. sumatranus*, *M. bicolor*, *M. viridis*, figured; H. E. Dresser, Monogr. Merop. pt. 5.

Merops erythropterus, its nest and eggs from Liberia; J. Büttikofer, Notes Leyd. Mus. viii [1886], p. 249.

Merops malimbicus, its egg; E. Hartert, J. f. O. 1886, p. 593 [Kutter]. *M. muscatensis*, n. sp., Muscat; R. B. Sharpe [in note], Ibis, 1886, pp. 15 & 165; H. E. Dresser, Monogr. Merop. pp. 40A-40B.

CORACIIDÆ.

Coracias garrula, sub voce "Roller"; A. Newton, Encycl. Brit. ed. 9, vol. xx.

BUCCONIDÆ.

Bucconidæ, sub voce "Puffbird"; *id. ibid.*

TROGONIDÆ.

Trogonidæ, sub voce "Quezal" fig.; *id. ibid.*

RHAMPHASTIDÆ.

Aulacorhamphus dimidiatus, n. sp., Venezuela; R. Ridgway, P. U. S. Nat. Mus. 1886, p. 93, & Auk, iii, p. 333. *A. whitelyanus* = *Pteroglossus sulcatus*, Cab. probably; O. Salvin, Ibis, 1886, p. 66.

CAPITONIDÆ.

Barbatula bocagii, n. sp., near *B. leucotis*, Caconda [Angola]; J. A. de Sousa, J. Sci. Lisb. 1886, p. 158.

Psilopogon pyrolophus from Malacca Mts.; R. B. Sharpe, P. Z. S. 1886, p. 352.

Trachyphonus böhmii from Mrumi, Ugogo, should perhaps be separated as a constant variety from the type; G. Hartlaub, Ibis, 1886, p. 110. *T. shelleyi*, n. sp., figured, Somali-land; G. Hartlaub, Ibis, 1886, p. 105 [= *T. erythrorhynchus*, Zool. Rec. xxii, *Aves*, p. 50]. Remarks on other species of the genus; *id. ibid.*

CUCULIDÆ.

Centropus savorgnani, n. sp., Franceville, Congo; E. Oustalet, Le Nat. 1886, p. 299.

Coccyzus brazzae, n. sp., near *C. jacobinus*; Diele, Congo, *id. ibid.*

Cuculus canorus, the question of the removal of the eggs and young of the foster parents; A. Walter, J. f. O. 1886, pp. 66-78: figured

E. T. Booth, Rough Notes, &c., pt. xiii. *C. peninsula*, n. sp., Commander Is.; L. Stejneger, Orn. Expl. in Com. Is. and Kamtsch. [omitted in Zool. Rec. xxii, *Aves*, p. 30].

Eudynamis melanorhyncha, colours during and after change of plumage; W. Blasius, Z. ges. Orn. 1886, p. 96.

Geococcyx californianus, skel. figured, anatomy, &c.; R. W. Shufeldt, J. Anat. Phys. xx, pp. 244-266, pls. vii-ix: osteology of the young bird; *id. op. cit.* xxi, pp. 101 & 102: its anatomy [2nd paper]; *id.* P. Z. S. 1886, pp. 466-491, pls. xlii-xlv: notes on its nest and young; W. E. D. Scott & J. A. Allen, Auk, iii, p. 425.

Hierococcyx bocki, n. sp., W. Sumatra; R. G. W. Ramsay, Ibis, 1886, p. 157 [and key to species of this genus].

Microdynamis parva figured; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 12, pl. v. fig. 2.

MUSOPHAGIDÆ.

SCHALOW, H. Die Musophagidæ. Monographische Studien. J. f. O. 1886, pp. 1-77.

The author recognizes the following genera and species, giving keys to each:—I. *Musophaga*, Isert; spp. *violacea*, Is., *rossæ*, Gould. II. *Corythaix*, Ill.; spp. *leucolopha* (Hgl.), *persa* (L.), *buffonii* (Vieill.), *livingstonii* (Gray), *cabanisi*, Rehw., *reichenowi*, Fischr., *albocristata* (Strickl.), *schuttii*, Cab., *macrorhyncha*, Fras., *meriani*, Rüpp., *hartlaubi*, Fischr. & Rehw., *leucotis*, Rüpp., *erythrolophus* (Vieill.), *fischeri*, Rehw. III. *Gallirex*, Less.; spp. *porphyreolophus* (Vig.), *chlorochlamys*, Shell. IV. *Corythocola*, Heine; sp. *cristata* (Vieill.). V. *Schizorhis*, Wagl.; spp. *concolor* (Smith), *leucogaster* (Rüpp.), *africana* (Lath.), *zonura* (Rüpp.). VI. *Gymnoschizorhis*, n. g.; spp. incl. *Ohizaerhis personata*, Rüpp. [type], *Schizorhis leopoldi*, Shelley [P. Z. S. 1842, p. 8, and Ibis, 1881, p. 117 respectively]. He records the known figures of each species and prefixes a full bibliography.

Gymnoschizorhis, n. g. [see SCHALOW, H., above].

PSITTACI.

Bolborhynchus orbignesius from Tarapacá, N. Chili; P. L. Selater, P. Z. S. 1886, p. 399.

Charmosyna stellæ, n. sp., near *C. papuensis*, Hufeisen Mts., New Guinea; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 9, pl. ii.

Chrysotis caymanensis, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 457.

Conurus carolinensis, skel. figured, &c.; R. W. Shufeldt, J. Anat. Phys. 1886, pp. 407-425, pls. x & xi. *C. rubritorquis*, n. sp., South America? or West Indies?; P. L. Selater, P. Z. S. 1886, p. 538, pl. lvi.

Cyclopsittacus salvadorii figured; E. Oustalet, N. Arch. Mus. (2) viii [1885], p. 300, pl. xii.

Eos incondita, n. sp., near *E. fuscata*, Jobi I., S.E. New Guinea ; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 6, pl. i, fig. 2. *E. fuscata* figured ; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxi.

Lorius garrulus, its occurrence in Celebes uncertain ; W. Blasius, Z. ges. Orn. 1886, p. 176.

Myiopsitta lineola, further details of young and adults ; R. Ridgway, P. U. S. Nat. Mus. 1886, p. 94.

Platycercus unicolor rediscovered in Antipodes I., New Zealand ; F. W. Hutton, Ibis, 1886, p. 385.

Psittacella madarászi, n. sp. [♂, ♀?] near *P. modesta*, Hufeisen Mts., New Guinea ; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 4, pl. i, fig. 1 : also figured by R. B. Sharpe [J. Gould], Birds of New Guinea, pt. xxii. *P. pallida*, n. sp. [♀], near *P. brehmi*, Hufeisen Mts., New Guinea ; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 3.

Psittacula passerina and *P. gregarius* are probably synonymous ; O. Salvin, Ibis, 1886, p. 70.

STRIGES.

Athene noctua, skeleton figured ; A. B. Meyer, Abbild. Vogel-skel. pt. x : figured, Lord Lilford, Col. Fig. of Br. Birds, pt. iii.

Bubo blakistoni from S.E. Ussuria ; P. L. Selater (L. Taczanowski), P. Z. S. 1886, p. 125. *B. maximus* from Japan ; J. H. Gurney, Ibis, 1886, p. 524. *B. milesi*, n. sp., Muscat ; R. B. Sharpe, Ibis, 1886, p. 163, pl. vi.

Megascops elegans re-discovered at Oroku, Okinawa Shima, Liu-Kiu Is. ; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 640.

Micrathene graysoni, n. sp., Socorro I., W. Mexico ; R. Ridgway, Auk, iii, p. 333.

Ninox dimorpha figured ; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxii.

Nyctea nivea, skeleton figured ; A. B. Meyer, Abbild. Vogel-skel. pt. x.

Scops giu figured ; Lord Lilford, Col. Fig. of Br. Birds, pt. iii.

Strix flammea, name probably derived from flammeum = yellow veil, and not flamma = flame ; T. Salvadori, Ibis, 1886, p. 377.

ACCIPITRES.

CATHARTIDÆ.

Catharista atrata, its breeding habits ; W. Hoxie, Auk, iii, pp. 245-247.

FALCONIDÆ.

Accipiter, *Astur* [see HARTING, J. E.].

Astur melanochlamys figured ; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxii.

Aquila nœvia and *A. clanga*, notes on ; J. H. Gurney, Naturalist, 1886, pp. 45-47.

Buteo abbreviatus breeding in Arizona, ♂ ad. and juv., and ♀ described ; E. A. Mearns, Auk, iii, pp. 63-67. *B. latissimus*, melanistic variety ; R. Ridgway, P. U. S. Nat. Mus. 1886, p. 248. *B. unicolor* from Br. Guiana, remarks and comparison with the type, by E. Oustalet ; O. Salvin, Ibis, 1886, p. 73. *B. vulgaris* figured ; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. xiii.

Butorides macrorhyncha, difference from *B. javanica* confirmed ; W. Blasius, Z. ges. Orn. 1886, p. 178.

Circus aeruginosus figured ; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. xxxii.

Dryotriorchis spectabilis, a third specimen (from Liberia) ; J. Büttikofer, Notes Leyd. Mus. viii [1886], p. 246.

Erythrotriorchis doriae figured ; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxi.

Falco fuliginosus may be synonymous with *Circus aeruginosus* ; V. de los Reyes y Prosper, An. Soc. Esp. xv, p. 109. *F. gyrfalco* figured ; C. Babington, Birds of Suffolk, pl. i. *F. neglectus*, Schleg., probably a good species ; E. Hartert, J. f. O. 1886, p. 599. *F. subbuteo*, ♂ ad. and juv. figured ; Lord Lilford, Col. Fig. of Br. Birds, pts. ii & iii.

Gypaëtus barbatus, habits in the breeding season ; F. C. Keller, Z. ges. Orn. 1886, pp. 39-65.

Gypocittinia melanosternon, its nestling plumage and its eggs ; J. H. Gurney, Ibis, 1886, pp. 457 & 458.

Lophotriorchis kieneri, note on ; S. Bligh [J. H. Gurney], Ibis, 1886, p. 299.

Machærhamphus revoili, n. sp., between *M. alcinus* and *M. anderssoni*, Somali-land ; E. Oustalet, Bibl. haut. études, xxxi, Art. 10, pp. 2 & 3.

Milvus govinda breeds much earlier than is usually supposed, beginning in September ; H. E. Barnes, J. Bomb. Soc. 1886, p. 41.

Neophron monachus, its nest and egg ; E. Hartert, J. f. O. 1886, p. 601.

Polioæctus ichthyaetus, its egg ; H. Parker, Ibis, 1886, p. 183.

Regerhinus uncinatus new to Antilles ; J. G. Wells, P. U. S. Nat. Mus. 1886, p. 630.

Spilornis spilogaster, its egg ; H. Parker, Ibis, 1886, p. 182.

Urubitinga anthracina breeding in Arizona, ♀ ad., ♂ nestling described (the latter for the first time) ; E. A. Mearns, Auk, iii, pp. 69-73.

SERPENTARIIDÆ.

Serpentarius, sub voce "Secretary-bird," fig. ; A. Newton, Encycl. Brit. ed. 9, vol. xxi.

STEGANOPODES.

FREGATIDÆ.

Fregata minor new to Tenimber Is. ; J. Büttikofer, Notes Leyd. Mus. viii [1886], pp. 58 & 68.

PELECANIDÆ.

Pelecanus, n. sp. ?? [see NEVILL, H.] : *Pelecanus* [see HODEK, E. (Sen.)].

PHALACROCORACIDÆ.

Microcarbo melanoleucus, various stages of plumage; W. Blasius, Z. ges. Orn. 1886, p. 173.

Phalacrocorax carbo figured; E. T. Booth, Rough Notes, &c., pt. xi.

PLOTIDÆ.

Plotus gen. [see TRISTRAM, H. B.].

Plotus levaillanti figured, it is certainly the species which breeds at Antioch; *id.* Ibis, 1886, pp. 41-43, pl. iii. *P. melanogaster*, difference from *P. novæ-hollandiæ* confirmed; W. Blasius, Z. ges. Orn. 1886, p. 178.

HERODIONES.

ARDEIDÆ.

Ardeide varr. breeding on the Danube; J. Young, Tr. Norw. Soc. 1886, p. 170.

Ardea cinerea figured; E. T. Booth, Rough Notes, &c., pt. xiii. *A. picata* new to Tenimber Is.; J. Büttikofer, Notes Leyd. Mus. viii [1886], p. 67.

Ardetta minuta and *A. podiceps*, distinctions; J. H. Gurney, Ibis, 1886, p. 295. *A. neoæna*, n. sp., Florida (probably S.W.); C. B. Cory, Auk, iii, pp. 262 & 408.

CICONIIDÆ.

Abdimia, peculiarity of syrinx; F. E. Beddard, P. Z. S. 1886, p. 321, cut.

Ciconia abdimii, its nest; E. Hartert, J. f. O. 1886, p. 606. *C. alba* figured; E. T. Booth, Rough Notes, &c., pt. xi.

Leptoptilus crumenifer, its nest; E. Hartert, J. f. O. 1886, p. 607.

Xenorhynchus, peculiarity of syrinx; F. E. Beddard, P. Z. S. 1886, p. 321, cut.

PLATALÆIDÆ.

Platalæa leucorodia used to breed at Fulham; J. E. Harting, Zool, 1886, pp. 81-88, pl. i: the breeding station at Naarden, Holland, described; P. Crowley, P. Croyd. Club, 1886, p. 21: figured; E. T. Booth, Rough Notes, &c., pt. x.

ODONTOGLOSSÆ.

PHÆNICOPTERIDÆ.

Phenicopterus jamesi, n. sp., Tarapacá, N. Chili; P. L. Schater, P. Z. S. 1886, p. 399, pl. xxxvi, 2 cuts. *P. andinus*, its eggs; *id. ibid.* *P. roseus* near Venice; E. F. Trois, Atti Ist. Venet. (6) iv, pp. 125-129.

PALAMEDEÆ.

PALAMEDEIDÆ.

Chauna, *sub voce* "Screamer"; A. Newton, Encycl. Brit. ed. 9, vol. xxi. *C. chavaria*, anatomy [see BEDDARD, F. E.].

ANSERES.

ANATIDÆ.

Plates of various species; E. T. Booth, Rough Notes, &c., pts. x, xi, xii, & xiii.

Anas boscas, plumage at various epochs; L. d'Hamonville, Bull. Soc. Z. Fr. 1886, pp. 286-293; L. Taczanowski, Bull. Soc. Z. Fr. 1886, p. 310: Waterton's account of change of plumage in summer; J. E. Harting, Zool. 1886, p. 229: figured; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. cccxlix. *A. mergoides*, Kjärbölling, a third specimen [figured]; O. Wolschke, JB. Annab. Ver. 1883-85, pp. 112-127, pl. [pub. 1886].

Anser albifrons minutus shot near Holy Island, Northumberland, England; H. Seebohm, P. Z. S. 1886, p. 420. *A. indicus* shot in Skania, 3rd Aug., 1884 (perhaps escaped from Zool. Gard.); J. G. H. Kinberg, Zool. Gart. 1886, p. 324.

Bucephala clangula, anatomy of the trachea, comparison with other animals; A. Fiori, Atti Soc. Mod. Mem. 1884, pp. 31-64, pl. i.

Anas diazi, n. sp., Laguna del Rosario, Tlaxcala, and San Ysidro, State of Puebla, Mexico; R. Ridgway, Auk, iii, p. 332: full description; F. Ferrari-Perez, P. U. S. Nat. Mus. 1886, p. 171.

Bernicla, g.; A. de Montlezun, Bull. Soc. Acclim. 1886, pp. 132-167, cuts. *B. leucopsis* in Italy; A. Costa, Rend. Ac. Nap. xxv. p. 106.

Charitonetta, n. g., for Buffle-headed Duck; L. Stejneger, Orn. Expl. in Com. Is. and Kantsch. [omitted in Zool. Rec. xxii, *Aves*, p. 30].

Clangula glaucion probably breeds in Gairloch; J. H. Dixon, Gairloch, &c., p. 255.

Cygnus buccinator figured; C. Babington, Birds of Suffolk, pls. v & vi.

Dafila modesta, n. sp., Sidney I., Phoenix Group, Central Pacific; H. B. Tristram, P. Z. S. 1886, p. 79, pl. vii.

Fuligula marila, *sub voce* "Scaup"; A. Newton, Encycl. Brit. ed. 9, vol. xxi. *F. cristata* × *F. ferina*, a curious hybrid; H. Saunders, P. Z. S.

1886, p. 550. *F. rufina*, plumage [of young in down]; H. A. Macpherson, Zool, 1886, p. 489.

Nettapus pulchellus new to Celebes; W. Blasius, Z. ges. Orn. 1886, pp. 202 & 209.

Edemia, sub voce "Scoter"; A. Newton, Encycl. Brit. ed. 9, vol. xxi.

Plectropterus rüppellii suspected to breed on trees; E. Hartert, J. f. O. 1886, p. 611.

Spatula clypeata, sub voce "Shoveler"; A. Newton, Encycl. Brit. ed. 9, vol. xxi.

Tadorna, sub voce "Sheld-drake"; *id. ibid.* *T. rutila* × *Chenalopez egyptiaca*, curious hybrid from Cannes in Zool. Soc. Gard.; P. L. Selater, P. Z. S. 1886, p. 2.

COLUMBÆ.

COLUMBIDÆ.

Carpophaga subflavescens, n. sp., N. New Ireland; O. Finsch, Ibis, 1886, p. 2.

Chalcophaps hombroni and *C. wallacii* = *C. stephani*; W. Blasius, Z. ges. Orn. 1886, p. 179.

Columba gutturalis maxima, skeleton figured; A. B. Meyer, Abbild. Vogel-skel, pt. x. *C. livia*, *C. aenas*, figured; E. T. Booth, Rough Notes, &c., pts. xi & xii.

Engyptila collaris, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 498. *E. (Leptoptila) fulviventris* [cf. Zool. Rec. xix, *Aves*, p. 41], specific rank confirmed; G. N. Lawrence, Ann. N. York Ac. iv, p. 272. *E. vinaceifulva*, n. sp., Temax, Yucatan; *id. t. c.* p. 271.

Eutrygon leucopareia, n. sp., near *E. terrestris*, Hufoisen Mts., New Guinea; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 29.

Macropygia albicapilla, various stages of plumage; W. Blasius, Z. ges. Orn. 1886, p. 133. *M. macassariensis* is most probably based on the young state of *M. albicapilla*, and is not distinct; *id. t. c.* p. 179.

Osmotreron vernans, plumage of the young ♂ before and during its change to that of the adult, probably described for the first time; *id. t. c.* pp. 127 & 178.

Polioptila albiventris, n. sp., Temax, Yucatan; G. N. Lawrence, Ann. N. York Ac. iii, p. 273.

Ptilopus (Rhampophilus) marchii figured; E. Oustalet, N. Arch. Mus. (2) viii [1885], p. 303, pl. xiii. *P. melanocephalus* from Banguey; A. Everett, Ibis, 1886, p. 525. *P. patruelis*, n. sp., near *P. bellus*, Hufoisen Mts., New Guinea; O. Finsch & A. B. Meyer, Z. ges. Orn. 1886, p. 27, pl. vi.

Treron permagna, n. sp., Napa, Okinawa Shima, Liu-Kiu Is.; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 637.

Tympanistria virgo, n. sp., Djanda, E. Equat. Africa; G. Hartlaub, Ibis, 1886, p. 4.

Zenaida spadicea, n. sp., I. of Grand Cayman, W.I.; C. B. Cory, Auk, iii, p. 498.

PTEROCLIDÆ.

Pteroclidæ, sub voce "Sand-grouse"; A. Newton, Encycl. Brit. ed. 9, vol. xxi.

Syrrhaptes paradoxus figured; C. Babington, Birds of Suffolk, pls. ii & iii.

GALLINÆ.

TETRAONIDÆ.

Plates of various species; E. T. Booth, Rough Notes, &c., pts. x & xiii.

Hybrids fully discussed; R. Collett, P. Z. S. 1886, pp. 224-240, pls. xxi & xxii [cf. J. Pleske, Vögel der Kola].

Tetrao tetrix × *Phasianus colchicus*; W. C. Angus, Tr. N. H. Soc. Glasg. 1884-85, p. 260, pl. iii: also figured; A. Fritsch, MT. orn. Ver. Wien, 1886, pp. 98-100, pl.

Lagopus albus × *Tetrao tetrix*; K. G. Henke, Z. ges. Orn. 1886, pp. 267-269: contradiction of a statement in paper by R. COLLETT, q. v., that the grouse described as *Tetrao albo-tetrix* [cf. Zool. Rec. xxii, *Aves*, p. 56] is a partial albino of *T. tetrix* ♀; A. B. Meyer, P. Z. S. 1886, p. 419: also figured; R. Collett, P. Z. S. 1886, pls. xxi & xxii.

Lagopus albus, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. xi. *L. mutus* figured; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. ccxlvii. *L. rupestris* in Iceland; H. H. Slater & T. Carter; Ibis, 1886, p. 49.

Tetrao tetrix figured; A. B. Meyer, Abbild. Vogel-skel. p. xi: hybrids with *Phasianus colchicus*; *id.* Nature, xxxiv, p. 218.

Tetraophasis desgodinsi, n. sp., near *T. obscurus*, Yer-ka-lo, on the Mekong, China; E. Oustalet, Le Nat. 1886, p. 275. *T. széchenyii* from Central (not Eastern) Tibet; J. v. Madarász, Ibis, 1886, p. 145 (note). [Cf. Zool. Rec. xxii, *Aves*, p. 56.]

Tympanuchus americanus (Reich.) is the oldest synonym of the Western Prairie Hen; R. Ridgway, Auk, iii, p. 132.

PHASIANIDÆ.

Plates of various species; E. T. Booth, Rough Notes, &c., pt. xiii.

Colinus ridgwayi [cf. Zool. Rec. xxii, *Aves*, p. 56]; H. Brown, Forest and Stream, xxv, p. 445: R. Ridgway, t. c. p. 484: J. A. Allen, Bull. Am. Mus. N. H. i, pp. 273-290, pl. xxiii—the set of papers making a full account of the species.

Coturnix, sub voce "Quail"; A. Newton, Encycl. Brit. ed. 9, vol. xx.

Crossoptilon mantchuricum, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. x.

Francolinus bicalcaratus, its eggs, &c.; E. Hartert, J. f. O. 1886, p. 603 [Kutter]. *F. lathamii*, description of young; J. Büttikofer, Notes Leyd. Mus. viii [1886] p. 265.

Gallus ecaudatus, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. xi.

Numida marchii, n. sp., Gaboon, Franceville (Congo), figured; E. Oustalet, N. Arch. Mus. (2) viii [1885], p. 305, pl. xiv. *N. mitrata*, skeleton figured; A. B. Meyer, Abbild. Vogel-skel, pt. x.

Peloperdix javanica, skeleton figured; *id. op. cit.* pt. xi.

Pediculus, notes on; B. de Montessus, Mém. Soc. Sâone, vi [1885], p. 36.

Perdix cinerea, skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. xi.

Phasianus komarowii, n. sp., from the Aschabad market, probably occurs in Herat and the Ssaryk-Turcoman country; M. Bogdanow, Bull. Pétersb. xxx, p. 356; *id.* Mel. Biol. xii, p. 318. *P. torquatus* from St. Helena is not differentiated from the Asiatic species; H. Seebohm, Zool. 1886, p. 225.

Philortyx personatus, n. sp., Chietla, State of Puebla, Mexico; R. Ridgway, Auk, iii, p. 333: full description; F. Ferrari-Perez, P. U. S. Nat. Mus. 1886, p. 176.

Pucrasia meyeri, n. sp., Tibet; J. v. Madarász, Ibis, 1886, p. 145.

Rheinartius ocellatus figured; E. Oustalet, N. Arch. Mus. (2) viii [1885], p. 256, pl. ii.

Synoicus lodoisiae, new genus *Perdortyx* proposed for it; B. de Montessus, Mém. Soc. Sâone, vi, p. 36.

MEGAPODIIDÆ.

Megapodius brenchleyi figured; J. Gould [R. B. Sharpe], Birds of New Guinea, pt. xxii.

CRACIDÆ.

Nothocrax urumutum, the male has a convoluted trachea, the female a simple trachea; F. E. Beddard, P. Z. S. 1886, p. 321, cuts.

TURNICIDÆ.

Turnix blakistoni new to Japan, both as regards genus and species; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 634 [from Napa, Okinawa Shima, Liu-Kiu Is.].

FULICARIÆ.

RALLIDÆ.

Rallidæ, sub voce "Rail"; A. Newton, Encycl. Brit. ed. 9, vol. xx.

Gallinula chloropus figured; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. cccxvii.

Notornis [see PARKER, T. J.].

Ocydromus australis, its habits; W. W. Smith, Tr. N. Z. Inst. 1885, pp. 131-134.

Ortygometra nigra, skeleton figured ; A. B. Meyer, Abbild. Vogel-skel. pt. xi.

Porphyrio calvus var. *palliatu*s, various stages of plumage ; W. Blasius, Z. ges. Orn. 1886, p. 154. *P. chloronotus* and *P. cœruleus* in Britain ; J. H. Gurney, Jun., Zool. 1886, p. 71. *P. ellioti* most probably should be united with *P. calvus* var. *palliatu*s ; W. Blasius, Z. ges. Orn. 1886, p. 179. *P. variegatus*, note on ; V. de los Reyes y Prosper, An. Soc. Esp. xv, p. 109.

Porzana tabuensis new to the Philippines ; R. G. W. Ramsay, Ibis, 1886, p. 161.

Psammocrex petiti, nn. g. & sp., Landana, Congo ; E. Oustalet, Le Nat. 1884, p. 508.

Rallus jouyi, n. sp., Shanghai, China ; L. Stejneger, P. U. S. Nat. Mus. 1886, pp. 362-364 [with remarks on *R. striatus* and *R. gularis*]. *R. peruvianus* n. sp., loc. incert. [coll. Raimondi] ; L. Taczanowski, Orn. du Pérou, iii, p. 313. *R. plateni*, n. sp., Runukan, N. Celebes ; W. Blasius, Braunsch. Anzeiger vom 3 März 1886 [cf. J. f. O. 1886, p. 399]. *R. aquaticus* figured ; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. cccix.

ALECTORIDES.

GRUIDÆ.

Balearica pavonina, skeleton figured ; A. B. Meyer, Abbild. Vogel-skel. pt. xi.

CARIAMIDÆ.

Cariama, sub voce "Seriema," fig. ; A. Newton, Encycl. Brit. ed. 9, vol. xxi.

OTIDIDÆ.

Otis tarda in Istria ; B. Schiavuzzi, Z. ges. Orn. 1886, p. 183. *O. tetraz*, skeleton figured ; A. B. Meyer, Abbild. Vogel-skel. pt. xi.

LIMICOLÆ

Limicolæ, sub voce "Sheathbill" ; A. Newton, Encycl. Brit. ed. 9, vol. xxi.

ŒDICNEMIDÆ.

Œdicnemus crepitans figured ; E. T. Booth, Rough Notes, &c., pt. xiii.

PARRIDÆ.

Hydrophasianus chirurgus, its nest and young ; H. Parker, Ibis, 1886, p. 188.

CHARADRIIDÆ.

Plates of various species ; E. T. Booth, Rough Notes, &c., pts. xi & xii. *Ægialitis dubia*, skeleton figured ; A. B. Meyer, Abbild. Vogel-skel. pt. xi. *Æ. geoffroyi* is specifically distinct from *Æ. asiatica* ; W. Blasius, Z. ges. Orn. 1886, p. 179. *Æ. mongolica*, difference from *Æ. pyrrhothorax* confirmed ; *id. ibid.* *Æ. occidentalis*, Cab., from Tarapacá, N. Chili ; P. L. Slater, P. Z. S. 1886, p. 403. *Æ. vereda*, difference from *Æ. asiatica* and *Æ. montana* confirmed ; W. Blasius, Z. ges. Orn. 1886, p. 179. *Æ. vociferus* new to Madeira ; J. Y. Johnson, Madeira, its Climate, &c., p. 192.

Charadrius fulvus, difference from *C. virginicus* confirmed ; W. Blasius, Z. ges. Orn. 1886, p. 179. *C. virginicus* shot near Perth, N.B. ; J. G. Millais, Zool. 1886, p. 26.

Cursorius gen. ; H. Seebohm, Ibis, 1886, pp. 115-121. *C. [gallicus] somalensis* [*cf.* Zool. Rec. xxii, *Aves*, p. 58] elevated to the rank of a species ; H. Seebohm, Ibis, 1886, p. 116.

Eudromias morinellus figured ; H. A. Macpherson & W. Duckworth, Birds of Cumberland, frontis. : possibly breeding near Gairloch ; J. H. Dixon, Gairloch, &c., p. 249.

Glareola cinerea, its nest and eggs ; E. Hartert, J. f. O. 1886, p. 610.

Haematopus, gen. ; H. Seebohm, Zool. 1886, pp. 41-49. *H. galapagensis*, n. sp., near *H. palliatus*, Temm., Chatham I., Galapagos ; R. Ridgway, Auk, iii, p. 331, & P. U. S. Nat. Mus. 1886, p. 325.

Himantopus, gen. ; H. Seebohm, Ibis, 1886, pp. 224-237.

Lobivanellus superciliosus, n. sp., Ana Mpara (Marungu), E. Africa ; A. Reichenow, J. f. O. 1886, p. 116, pl. iii, fig. 2.

Vanellus resplendens has no hind toe ; P. L. Slater, P. Z. S. 1886, p. 403.

SCOLOPACIDÆ.

Plates of various species ; E. T. Booth, Rough Notes, &c., pts. xi, xii, & xiii. *Scolopacide*, pt., *sub voce* "Sandpiper" ; A. Newton, Encycl. Brit. ed. 9, vol. xxi.

Actitis hypoleucos figured ; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. cexci.

Calidris arenaria breeding in Iceland ? ; H. H. Slater & H. Carter, Ibis, 1886, p. 50.

Gallinago gallinula figured ; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. cccviii.

Machetes pugnax, *sub voce* "Ruff," fig. ; A. Newton, Encycl. Brit. ed. 9, vol. xxi : skeleton figured ; A. B. Meyer, Abbild. Vogel-skel. pt. xi.

Numenius, gen. ; H. Seebohm, Zool. 1886, pp. 137-148. *N. cyanopus* new to Celebes ; W. Blasius, Z. ges. Orn. 1886, pp. 199 & 209. *N. phaeopus* probably breeding on North Rona ; J. A. Harvie-Brown, P. Phys. Soc. Edinb. 1885-86, p. 294.

Scolopax, gen. ; H. Seebohm, Ibis, 1886, pp. 122-144. *S. major* near Glasgow, in 1885 ; W. Evans, P. Phys. Soc. Edinb. 1885-86, p. 184.

Terekia cinerea, its occurrence in Celebes uncertain ; W. Blasius, Z. ges. Orn. 1886, p. 176.

Tringa damacensis new to N. America ; R. Ridgway, Auk, iii, p. 275.
T. maculata figured ; C. Babington, Birds of Suffolk, pl. iv.

GAVIÆ.

LARIDÆ.

Plates of various species ; E. T. Booth, Rough Notes, &c., pts. xi & xii.
Chroocephalus minutus figured ; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. cccxcvi.

Hydrochelidon hybrida new to Celebes ; W. Blasius, Z. ges. Orn. 1886, pp. 204 & 209.

Larus barrovianus, n. sp., Bering's Sea, Point Barrow to Japan ; R. Ridgway, Auk, iii, p. 330. *L. rossi*, egg from Disco Bay (Christianshaab) ; H. Seebohm, P. Z. S. 1886, p. 82 ; J. J. Dagleish, Auk, iii, pp. 273 & 274 [♀ said to be shot off the nest].

Lestris parasitica at Modena ; L. Picaglia, Atti Soc. Mod. Mem. (Rendic.) 1886, pp. 41-43.

Sterna anæstheta in United States [S. Carolina] ; W. Brewster, Auk, iii, p. 131. *S. bernsteini*, *S. melanauchen*, in Diego Garcia, Chagos Group ; H. Saunders, P. Z. S. 1886, pp. 336 & 337. *S. fluviatilis* and *S. arctica*, measurements (esp. of tarsus) as a means of distinction ; A. v. Mojsisovics, MT. Ver. Steierm. 1886, p. 119. *S. fuliginosa* at Bath, third occurrence in Great Britain ; H. Saunders, P. Z. S. 1886, p. 6.

TUBINARES.

PROCELLARIIDÆ.

Daption capense, skeleton figured ; A. B. Meyer, Abbild. Vogel-skel. pt. xi.

Diomedea exulans, its eggs ; E. Fairmaire, Mém. Soc. Sâone, 1884, p. 16.

Æstrelata gularis, additional notes, *Æ. scalaris*, n. sp., taken in Western New York ; W. Brewster, Auk, iii, pp. 389-393. *Æ. sandwichensis* = *Procellaria meridionalis* ; R. Ridgway, P. U. S. Nat. Mus. 1886, p. 96.

Ossifraga gigantea, anatomy ; M. Cazin, Bibl. haut. étud. xxxi. p. 27.

Pealea, n. g., type *Thalassidroma lineata*, Peale ; R. Ridgway, Auk, iii, p. 334.

Procellaria parkinsoni, *P. gouldi*, *P. cooki*, their breeding, &c. ; A. Reischek, Tr. N. Z. Inst. 1885, p. 87, & MT. orn. Ver. Wien. 1886, pp. 109-112.

Puffinus, *sub voce* "Shearwater" ; A. Newton, Encycl. Brit. ed. 9, vol.

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xxi. *P. assimilis*, *P. gavius*, their breeding, &c.; *id. ibid.* *P. anglorum*, habits and plumage; H. A. Macpherson, Tr. Norw. Soc. 1886, pp. 215-225: figured; E. T. Booth, Rough Notes, &c., pt. xii. *P. edwardsi*, n. sp., Cape de Verd Is.; E. Oustalet, Ann. Sci. Nat. xv (1883), art. 5.

Thalassidroma, see *Pealea*, n. g. *T. leachi* breeding on Blasquets, Kerry, Ireland; R. J. Ussher, Zool. 1886, p. 367.

PYGOPODES.

PODICIPEDIDÆ.

Plates of various species; E. T. Booth, Rough Notes, &c., pts. x, xii, & xiii.

Podiceps auritus has nested for many years on a freshwater loch in Gairloch parish; sometimes another pair is found about two miles off; J. H. Dixon, Gairloch, &c., p. 253.

COLYMBIDÆ.

Colymbus adamsi figured: C. Babington, Birds of Suffolk, pl. vii.; E. T. Booth, Rough Notes, &c., pt. xii.

ALCIDÆ.

Plates of various species; E. T. Booth, Rough Notes, &c., pts. xi & xii.

Alca torda, *sub voce* "Razorbill"; A. Newton, Encycl. Brit. ed. 9, vol. xx: skeleton figured; A. B. Meyer, Abbild. Vogel-skel. pt. xi.

Brachyrhamphus perdix (= *Cephus perdix*, Pall.) is a distinct species; it has been unearthed in Kamtschatka, and its nearest allies are *B. brevirostris* (*kittlitzii*) and *B. marmoratus*; the two latter are compared with the example [♀] of the former, all three being described; L. Stejneger, Z. ges. Orn. 1886, pp. 210-219, pl. vii.

Fratercula arctica, *sub voce* "Puffin"; A. Newton, Encycl. Brit. ed. 9, vol. xx: figured; E. H. Giglioli & A. Manzella, Icon. Avif. Ital. pl. ccccix.

Synthliborhamphus wumizusume as a N. Amer. bird; L. Stejneger, P. U. S. Nat. Mus. 1886, p. 524.

Uria arva, heads figured [one at least is that of *Alca torda*]; F. Fischer & A. v. Pelzeln, Vögel und Saug. Jan Mayen, p. 10, pl. ix.

CRYPTURI.

TINAMIDÆ.

Crypturus rubripes, n. sp., Lechugal; L. Taczanowski, Orn. du Pérou, iii, p. 303.

Nothoprocta godmani, n. sp. [= *N. taczanowskii*, Sel. & Salv., P. Z. S. 1874 pt.], Chachupata; *id. t. c.* p. 305.

RATITÆ.

APTERYGES.

APTERYGIDÆ.

HAAST, J. v. On *Megalapteryx hectori*, a New Gigantic Species of Apterygian Bird. Tr. Z. S. xii, 7, pl. xxx. [Cf. Zool. Rec. xxi, Aves, p. 68.]

IMMANES.

DINORNITHIDÆ.

Dinornis, see SMITH, W. W., and WHITE, T. *D. oweni*, n. sp., *D. curtus*; J. v. Haast, Tr. Z. S. xii, 8, pls. xxxi & xxxii. *D. elephantopus*, see OWEN, R.

MEGISTANES.

CASUARIIDÆ.

Casuaris, its air-sacs and connection with *Apteryx* and *Dromæus*, *Rhea* and *Struthio*; F. E. Beddard, P. Z. S. 1886, pp. 145 & 146.

RHEÆ.

RHEIDÆ.

Rhea fig.; A. Newton, Encycl. Brit. ed. 9, vol. xx.

STRUTHIONES.

STRUTHIONIDÆ.

Struthio camelus, rearing in Algeria, diseases and their cure; L. Merlato, Bull. Soc. Acclim. 1886, p. 65; M. Créput, t. c. p. 496.

SAURURÆ.

ARCHÆOPTERYX.

[See SHUFELDT, R. W.]

FORMÆ SEDIS INCERTÆ.

Gastornis klaasseni, short account; E. T. Newton, P. Geol. Ass. ix, pp. 349-351: full account; *id.* Tr. Z. S. xii, 6, pls. xxviii & xxix.

Struthiolithus chersonensis, its fossil egg; W. v. Nathusius, Zool. Anz. 1886, pp. 47-50.

REPTILIA AND BATRACHIA.

BY

G. A. BOULENGER.

GENERAL.

THE discovery of a "third eye," or "parietal eye," in certain *Reptilia* has been the most startling event in zoological science during the year 1886. Hereafter follows an enumeration of the contributions on this subject. To De Graaf is due the merit of having first clearly shown that (in *Anguis fragilis*) the pineal gland is modified into a structure comparable to an Invertebrate eye. To Spencer we are indebted for a more exhaustive investigation of the matter; the parietal eye he has shown to be more or less developed in a large number of Lizards and in *Hatteria*; and the parietal foramen of the Plesiosaurians, Ichthyosaurians, and Stegocephalians leaves no doubt that the organ was highly developed in those extinct forms. The suggestion of Ahlborn and of Rabl-Rückhard, that the pineal gland is the remnant of an organ of special sense in some primitive types, is thus confirmed.

GRAAF, H. DE. Zur Anatomie und Entwicklung der Epiphyse bei Amphibien und Reptilien. Zool. Anz. ix, pp. 191-194.

SPENCER, W. B. The Parietal Eye of *Hatteria*. Nature, xxxiv, pp. 33-35, figs.

GRAAF, H. DE. Bijdrage tot de Kennis van den Bouw en die Ontwikkeling der Epiphyse bij Amphibiën en Reptiliën. Leyden: 1886, 4to, 61 pp., 4 pls.

SPENCER, W. B. On the Presence and Structure of the Pineal Eye in Lacertilia. Q. J. Micr. Sci. xxvii, pp. 165-238, pls. xiv-xx.

RABL-RÜCKHARD, H. Zur Deutung der Zirbeldrüse (Epiphysis). Zool. Anz. ix, pp. 405-407.

The author remarks that as early as 1882 [*cf.* Zool. Rec. xix, *Pisces*, p. 11], and again in 1884 [*cf. op. cit.* xxi, *Pisces*, p. 15], he has arrived at the conclusion "that the glandula pinealis of Vertebrates is to be regarded as a rudimentary eye."

Remarks on the parietal eye by R. WIEDERSHEIM, *Anat. Anz.* i, pp. 148 & 149; E. KORSCHOLT, *Kosmos*, xix, pp. 176-185^o; and H. DE VARIGNY, *Rev. Sci.* (3) xii, pp. 806-809.

SAUVAGE, H. E. Brehm, *Merveilles de la Nature*. Edition Française. *Reptiles et Batraciens*. Paris: 1885, 4to.

*ASSAKY, G. *Origine des Feuilletts blastodermiques chez les Vertébrés*. Thèse à la Faculté de Médecine de Paris. Paris: 1886, 8vo, 136 pp. *Batrachia*, pp. 45-63; *Reptilia*, pp. 64-73.

BAUR, G. Ueber die Homologien einiger Schädelknochen der Stegocephalen und Reptilien. *Anat. Anz.* i, pp. 348-350.

Opisthoticum, Squamosum, and Supratemporale.

— Ueber die Morphogenie die Wirbelsäule der Amnioten. *Biol. Centralbl.* vi, pp. 332-342 & 353-363.

Deals chiefly with the *Stegocephala*.

*FRAISSE, P. Die Regeneration von Geweben und Organen bei den Wirbelthieren, besonders Amphibien und Reptilien. Cassel & Berlin: 1885, 4to, 164 pp., 3 pls.

Remarks by O. ZACHARIAS, *Biol. Centralbl.* vi, pp. 225-230.

HALLIBURTON, W. D. On the Blood Proteids of certain Lower Vertebrata. *J. Physiol.* vii, pp. 319-323.

KEHLER, G. Beiträge zur Kenntniss des Carpus und Tarsus der Amphibien, Reptilien, und Säuger. *Ber. Nat. Ges. Freiburg*, i, Heft. 4, 27 pp.

OSBORN, H. J. Observations upon the Presence of the Corpus Callosum in the Brains of the Amphibians and Reptiles. *Zool. Anz.* ix, pp. 200-205.

— The Origin of the Corpus Callosum, a Contribution upon the Cerebral Commissures of the Vertebrata. *Morph. JB.* xii, pp. 223-251, pls. xiii & xiv.

Batrachia and *Reptilia*, pp. 225-228 & 236-244.

KORÁNYI, A. Beiträge zur Entwicklung der Krystalllinse bei den Wirbelthieren. *Int. Journ. Anat. Hist.* iii, pp. 229-238.

Reptilia and *Batrachia*, pp. 234 & 235.

PARENTI, P., & PICAGLIA, L. Rettili ed Anfibi raccolti da P. Parenti nel viaggio di circumnavigazione della r. corvetta 'Vettor Pisani,' negli anni 1882-85, e da V. Ragazzi sulle coste del mar rosso e dell' America meridionale negli anni 1879-84. *Atti Soc. Mod., Mem.* (3) v, pp. 26-96.

FAUNÆ.

EUROPE.

CAMERANO, L. *Monographia dei Sauri Italiani*. *Mem. Soc. Tor.* (2) xxxvii, pp. 491-591, 2 pls.

An exhaustive account of the Lizards of Italy, in the style of the author's previous contributions on the Batrachians.

- *KOLOMBATOVIC, J. Imenik Kraljevica Dalmacije. II. Spalato : 1886, 8vo, 12 pp.

On the Reptiles, Batrachians, and Fishes of Dalmatia.

ASIA.

- RADDE, G. Die Fauna und Flora des südwestlichen Caspi-Gebietes. Leipzig : 1886, 8vo.

Reptiles and Batrachians by O. BETTGER, pp. 30-82.

- NIKOLSKY, A. M. Contribution to the Knowledge of the Fauna of Vertebrate Animals of North-Eastern Persia and Transcaucasia. [Russian text.] Tr. St. Petersb. Soc. Nat. xvii.

Reptiles and Batrachians, pp. 403-406.

- HALY, A. First Report on the Collection of Lizards in the Colombo Museum. Colombo : 1886, 8vo, 8 pp.

Geckonidae and *Agamidae* only.

- . First Report on the Collection of Snakes in the Colombo Museum. Colombo : 1886, 8vo, 18 pp.

- . First Report on the Collection of *Batrachia* in the Colombo Museum. Colombo : 1886, 8vo, 8 pp.

Lists of the species recorded from Ceylon, compiled from Günther's "Reptiles of British India" and the British Museum Catalogues ; a few notes on localities, coloration during life, &c., are added.

A List of the Snakes in the Collection of the Bombay Natural History Society ; PHIPSON, J. Bomb. Soc. i, pp. 84-86.

- BETTGER, O. Aufzählung der von den Philippinen bekannten Reptilien und Batrachier. Ber. Senck. Ges. 1886, pp. 91-134.

A complete systematic list, comprising 140 Reptiles and 27 Batrachians.

AFRICA.

- DOLLO, L. Note sur les Reptiles et Batraciens recueillis par M. le Capitaine Ém. Storms dans la Région du Tanganyka. Bull. Mus. Belg. iv, pp. 151-160, figs.

A genus and 2 species of Snakes are described as new.

- BOCAGE, J. V. B. DU. Reptiles e Amphibios de S. Thomé. Reptiles et Batraciens nouveaux de l'Ile de St. Thomé. J. Sci. Lisb. xlii, pp. 65-75, 103, & 104.

A list of 9 Reptiles and 3 Batrachians. A Lizard and 2 Frogs are given as new.

- BETTGER, O. Beiträge zur Herpetologie und Malakozoologie Südwest-Afrikas. I. Zur Kenntniss der Fauna von Angra Pequena. Ber. Senck. Ges. 1886, pp. 3-15, pl. i.

9 Reptiles are recorded from Angra Pequena. A new Viper is described.

AMERICA.

GOODE, G. B. The Fisheries and Fishery Industries of the United States. Section I, Natural History of Useful Aquatic Animals. Washington : 1884, 4to.

The useful aquatic Reptiles and Batrachians of the United States, by F. W. TRUE, pp. 137-162. *Crocodylia, Chelonia, Rana catesbiana*. Distribution, habits, economic value, &c.

HUGHES, E. Preliminary List of Reptiles and Batrachians of Franklin County, Indiana. Bull. Brookville Soc. ii, pp. 40-45.

BOCOURT, F. Mission Scientifique au Mexique et dans l'Amérique Centrale. 3e partie, Études sur les Reptiles et les Batraciens. Paris : 1886, folio, 10e livr. pp. 593-660, pls. xxxvi-xli.

Calamaroid and Coronelloid Snakes.

F. FERRARI PEREZ enumerates the Reptiles and Batrachians collected in Mexico by the Comision Geographica of Mexico. The determinations have been verified by Cope, who describes the new species. P. U. S. Nat. Mus. 1886, pp. 182-199.

COPE, E. D. Thirteenth Contribution to the Herpetology of Tropical America. P. Am. Phil. Soc. xxiii, pp. 271-287.

On collections from Nicaragua, Panama, Chiriqui, and Chihuahua.

— Catalogue of the Species of Batrachians and Reptiles contained in a Collection made at Pebas, Upper Amazon, by John Hauxwell. P. Am. Phil. Soc. xxiii, pp. 94-103.

BOULENGER, G. A. A Synopsis of the Reptiles and Batrachians of the Province Rio Grande do Sul, Brazil. Ann. N. H. (5) xviii, pp. 423-445.

A complete list, based upon the collections of Hensel and v. Ihering, with revised synonymy and keys to the genera and species.

AUSTRALIA AND POLYNESIA.

BOULENGER, G. A. On the Reptiles and Batrachians of the Solomon Islands. Tr. Z. S. xii, pp. 35-62, pls. vii-xiii.

A list of all the species found in the Solomon Group, with notes on the general habitats. The forms which are restricted to these islands are described.

MACLEAY, W. Zoology of Australia. P. R. Soc. Tasm. 1885, pp. 285-308.

An *aperçu* of the fauna. Reptiles and Batrachians, pp. 291-293.

PALÆONTOLOGICAL.

WINKLER, T. C. Étude ichnologique sur les empreintes de pas d'animaux fossiles, suivie de la description des plaques à impressions d'animaux qui se trouvent au Musée Teyler. Arch. Mus. Teyl. (2) ii, pp. 239-440, pls. viii-xix.

A review of all that is known on fossil tracks of *Reptilia*, with descriptions of tracks of *Rhamphorhynchus phyllurus*, Marsh, and *Pterodactylus kochi*, v. Mey., in the Musée Teyler.

On Batrachian remains from the caves of Mentone, Italy; E. Rivière, C.R. ciii, p. 1211.

W. DEECKE has notes on some Reptile-remains from the Trias of Lombardy (*Lariosaurus*, *Pachypleura*, *Macromerosaurus*, *Ichthyosaurus*, *Psephoderma*); Z. geol. Ges. xxxviii, pp. 170-197.

LYDEKKER, R. Siwalik Crocodilia, Lacertilia, and Ophidia. Pal. Ind. (10) iii, pp. 209-240, pls. xxviii-xxxv.

BURMEISTER, H. Exámen crítico de los Mamíferos y Reptiles fósiles denominados por A. Bravard. Ann. Mus. B. Aires, iii [1885] pp. 95-174.

Reptiles, pp. 145-152.

REPTILIA.

A. GÜNTHER & ST. GEORGE MIVART contribute the article "Reptiles" in the 9th edition of the Encyclopædia Britannica (vol. xx, pp. 432-473, figs.); the former dealing with the general subject, the literature, the classification, and the geological and geographical distribution; the latter with the anatomy.

BRONN, H. G. Klassen und Ordnungen des Thierreichs. vi. Abth. iii. *Reptilia*, by C. K. Hoffmann. Lief. 50-55, pp. 1569-1776, pls. cxxix-cxxxvii.

Anatomy (conclusion) and systematic of the *Ophidia*.

BEMMELEN, J. F. VAN. Entwikkeling en Metamorphose der kiew of visceralplatten en der aortenbogen bij embryonen van *Tropidonotus natrix* en *Lacerta muralis*. Versl. Ak. Amst. iii, ii, pp. 174-177.

—. Die Visceraltaschen und Aortenbogen bei Reptilien und Vögeln. Zool. Anz. ix, pp. 528-532 & 543-546.

Reply to some criticisms contained in the above paper; G. Fritsch, *t. c.* pp. 573 & 574.

GADOW, H. Remarks on the Cloaca and on the Copulatory Organs of the Amniota. Abstract, P. R. Soc. xl, pp. 266 & 267.

WIJHE, J. W. VAN. Ueber Somiten und Nerven im Kopfe von Vögeln und Reptilienembryonen. Zool. Anz. ix, pp. 657-660.

ORNITHOSAURIA.

NEWTON, E. T. Article "Pterodactyle," in *Encyclopædia Britannica*, 9th ed., xx, pp. 86 & 87, figs.

DINOSAURIA.

E. D. COPE remarks on the sternum of the *Dinosauria*, à propos of the recent controversy between Hulke and Dollo [*cf.* Zool. Rec. xxii, *Rept.* p. 6], and gives figures of the supposed sternum of *Diclonius* and *Monoclonius*, which confirm Dollo's interpretation; *Am. Nat.* xx, pp. 153-155, figs.

G. BAUR remarks on the vertebra of *Zunicodon*; *Zool. Anz.* ix, p. 742. *Iguanodon mantelli*. On a maxilla; Hulke, *Q. J. Geol. Soc.* xlii, p. 435, pl. xiv.

Neosodon, n. g., for a Dinosaur-tooth, regarded as indicating an omnivorous type, from the Upper Jurassic of Wimille, N. France; de la Moussaye, *Bull. Soc. géol.* (3) iii. [1885], p. 51, figs. Dollo, *Rev. Quest. sci.* xvii, p. 627, regards this tooth as that of a herbivorous Dinosaur, probably *Iguanodon præcursor*, Sauv. g.

Ornithocheirus hilsensis, Koken. Reply to Williston's criticisms; Koken, *Zool. Anz.* ix, pp. 21-23. Counter-reply by Williston; *t. c.* pp. 282 & 283.

THEROMORPHA.

COPE, E. D. On the Structure of the Brain and Auditory Apparatus of a Theromorphous Reptile of the Permian Epoch. *P. Am. Ass.* xxxiv, pp. 336-341, and *P. Am. Phil. Soc.* xxiii, pp. 234-237, pl.

Observations on a part of the skull of one of the *Diadectidae* (undetermined species), affording very clear information as to the aspect of the brain chamber.

E. D. COPE makes remarks on the long-spined *Theromorpha* of the Permian Epoch. A synopsis of the three species of *Naosaurus*, Cope, is given. *Am. Nat.* xx, pp. 544 & 545.

CHELONIA.

DOLLO, L. Première Note sur les Chéloniens du Bruxellien (Éocène Moyen) de la Belgique. *Bull. Mus. Belg.* iv, pp. 75-96, pls. i & ii.

Before describing the new genus *Pseudotrionyx*, the author reviews the classification of the *Chelonia* lately proposed by Cope, suggesting a few improvements and changes of names in the division *Cryptodira*. A hypothetical suborder is proposed, "*Prochéloniens* or *Odontochelones*," for ancestral, toothed forms. The question of the homology of the Chelonian plastron with the sternum of other Vertebrates is discussed, as well as the nomenclature of the bones of the plastron.

Remarks on this paper by R. Lydekker, Geol. Mag. (3) iii, pp. 522 & 523.

MITSUKURI, K., & ISHIKAWA, C. On the Formation of the Germinal Layers in *Chelonia*. Q. J. Micr. Sci. xxvii, pp. 17-48, pls. ii-v.

Researches made in Japan on *Trionyx japonicus*.

PILLIET, A. Sur les plaques osseuses dermiques des Tortues et des Tatous, et sur l'ossification par la moelle des os en général. Bull. Soc. Z. Fr. xi, pp. 623-651.

GADOW, H. On the Reproduction of the Carapax in Tortoises. J. Anat. Phys. xx, pp. 220-224, pl. vi.

The author has made the remarkable discovery that Land Tortoises are able to reproduce portions of their bony shell. From the healthy margins of the malpighian layer, the latter grows centripetally towards the injured area, right into the osseous plate, and thus causes its partial destruction. The superimposed shell and osseous plates, to the extent of the area to be mended, are cast off. Lastly, the remaining deep portions of the dermis make up for the loss by thickening.

G. BAUR has notes on the osteology of *Chelydra*. The caudal vertebræ are not all opisthocœlous; the two or three first are procœlous, the next one amphiœlous. Two ossa centralia carpi are present. Zool. Anz. ix, pp. 740-742.

L. VAILLANT, Bull. Soc. Philom. (7) x, pp. 135-138, has a note on the disposition of the digestive tract in the herbivorous Chelonians.

GAGE, S. H., & S. P. Aquatic Respiration in Soft-shelled Turtles: a Contribution to the Physiology of Respiration in Vertebrates. Am. Nat. xx, pp. 233-236.

It has been observed that in the American *Trionyx* the lungs are not the only respiratory organs. The mucous membrane of the pharynx is closely beset with filamentous processes, copiously supplied with blood, which have been assumed to have the function of the internal gills of Tadpoles. That such is really the case is demonstrated by the authors' experiments.

G. ROUCH has a paper on the mechanism of respiration in the Marine Turtles; Bull. Soc. Z. Fr. xi, pp. 461-470.

MILLS, T. W. The Rhythm and Innervation of the Heart of the Sea-Turtle. J. Anat. Phys. xxi, pp. 1-20, pl. i.

— Notes on the Urine of the Tortoise, with special reference to Uric Acid and Urea. J. Physiol. vii, pp. 453-457.

LIST, J. H. Zur Kenntniss des Blasenepithels einiger Schildkröten (*Testudo græca* und *Emys europæa*). Arch. mikr. Anat. xxviii, pp. 416-421, pl. xxvi.

J. SCHNECK, Am. Nat. xx, p. 897, remarks on the slow growth of Tortoises, and records the case of a *Cistudo carolina* known alive for more than 60 years.

E. A. GÖLDI gives an abstract from a Portuguese MS., by J. M. da

Silva Coutinho, upon the habits, capture, and economic use of the Chelonians of the basin of the Amazon, and founds an apparently new species of *Podocnemis*. Ber. St. Gall. Ges. 1884-85, pp. 273-280; also Zool. Gart. xxvii, pp. 329-335 & 366-372.

DEPÉRET, C. Description géologique du Bassin Tertiaire du Roussillon. Thèse présentée à la Faculté des Sciences de Paris. Paris: 1885, 8vo. Reptiles (Chelonians), pp. 214-222, pl. iv.

Testudo perpini, n. sp. (foss.), Depéret, t. c. p. 214, pl. iv, figs. 13 & 14, Pliocene of Roussillon.

Homopus noguayi, n. sp., Lataste, Le Nat. iii, p. 286, Upper Senegal.

Emys gaudryi, n. sp. (foss.), Depéret, t. c. p. 217, pl. iv, figs. 8 & 9, Pliocene of Roussillon.

Clemmys caspica, Gm.: notes on specimens from Lenkoran, Talysch; Böttger, in Radde, Faun. Casp.-Geb. p. 35. *C. watsoni*, n. sp. (foss.), Lydekker, Q. J. Geol. Soc. xlii, p. 540, pl. xv, Pliocene Siwaliks, India.

Pseudotrionyx, n. g. (foss.), for a shell apparently allied to *Anostira*, Leidy, but differently sculptured. *P. delheidi*, n. sp., Dollo, Bull. Mus. Belg. iv, p. 96, pls. i & ii, Upper Eocene of Melsbroek, near Brussels.

On the food of *Thalassochelys caretta*; G. Pouchet & J. de Guerne, C.R. cii, pp. 877-879.

Notochelys costata, Ow. (foss.), is from the Cretaceous beds of Landsborough Creek; R. Etheridge, Jun., Geol. Mag. (3) iii, p. 239.

Pachyrhynchus, n. g. (foss.) [name preoccupied], type of a new sub-family of *Chelonidae*, *Pachyrhynchinae*, characterized by the very long and flat mandibular symphysis and the position of the choanæ; Dollo, Bull. Mus. Belg. iv, p. 130, figs. For *Chelone longiceps*, Ow., *planinentum*, Ow., *trigoneiceps*, Ow., and *P. gosseleti*, n. sp., *id.* t. c. p. 138, from the Lower Eocene of Erquelinnes, Belgium. [Cope had previously proposed (1871) the name *Puppigerus* for the above Owenian species.—REC.]

Meiolania platyceps and *M. minor*, n. g. & spp. (foss.), Owen, P. R. Soc. xl, p. 315 (Abstract), Lord Howe's Island. For a g. or subg. related to *Megalanina*. [These remains have since been shown by Huxley to be Chelonian.—REC.]

R. OWEN describes some fossil remains, including foot-bones, from Queensland, which he refers to *Megalanina prisca*, Ow.; Phil. Tr. clxxvii, pp. 327-330, pl. iv.

Platemys torrentium, n. sp. (foss.), Burmeister, An. Mus. B. Aires, iii, p. 147, Tertiary of Parana.

Hydromedusa tectifera, Cope. Burmeister regards *H. wagleri*, Gthr., and *H. platensis*, Gray, as individual variations of *H. maximiliani*, Wagl.; An. Soc. Arg. xxi, p. 5.

Podocnemis coutinhii, n. sp., Göldi, Ber. St. Gall. Ges. 1884-85, p. 279, pl. v, Amazon.

Carettochelys, n. g., Ramsay, P. Linn. Soc. N. S. W. (2) i, p. 158. Apparently a pleurodiran fresh-water Turtle, with the limbs much as

in the Marine Turtles, and without epidermic scutes on the shell. *C. insculptus*, n. sp., *id. t. c.* pls. iii-vi, Fly River, New Guinea.

Dermatochelys (Sphargis) is regarded by Baur as the most specialised form of the marine Turtles, from which it should not be separated; *Zool. Anz.* ix, p. 687.

Psephoderma, H. v. Mey. (foss.), is undoubtedly a Chelonian; Baur, *t. c.* p. 688. [A view expressed by Cope in 1870.—REC.]

CROCODILIA.

WOODWARD, A. S. The History of Fossil Crocodiles. *P. Geol. Ass.* ix, pp. 288-344, figs.

A review of the more important types, with special reference to those from British formations.

KOKEN remarks on the brain and auditory organs of fossil Crocodiles; *SB. nat. Fr.* 1886, pp. 2-4.

BAUR, G. The Proatlas, Atlas, and Axis of the Crocodilia. *Am. Nat.* xx, pp. 288-293, figs.

On the number of præsacral vertebræ in the Crocodilia; G. Baur, *Zool. Anz.* ix, pp. 689 & 690. On the chevron bones and the quadratojugal; *id. t. c.* pp. 738 & 739. On the so-called post-frontal (= post-orbital), and on the hind limb; *id. t. c.* p. 740.

On the probability of Alligators having been floated from San Domingo to Magna, Bahamas, on logs of wood; J. Gardiner, *Nature*, xxxix, p. 546.

HOFMANN, A. Crocodiliden aus dem Miocæn der Steiermark. *Beitr. Pal. Oesterr.-Ung.* v, pp. 26-35, pls. xi-xv.

Two new species are described.

Crocodylus robustus, Vaill. & Grand.: on a sub-fossil humerus formerly referred by Guldberg to *Æpyornis*; Dames, *SB. nat. Fr.* 1886, pp. 68-70. *C. palæindicus*, Falc. (foss.), described by Lydekker, *Pal. Ind.* (10) iii, p. 217, pls. xxviii, fig. 2, & xxix, fig. 3. *C. sivalensis*, n. sp. (foss.), *id. t. c.* p. 213, pls. xxviii, figs. 1 & 3, & xxix, figs. 2 & 4, Siwalik Hills. *C. steineri*, n. sp. (foss.), Hofmann, *t. c.* p. 27, pls. xi-xiii, Miocene of Wies, Styria.

Crocodylus (Alligator) styriacus, n. sp. (foss.), Hofmann, *t. c.* p. 33, pls. xiv & xv; Miocene of Wies, Styria.

Crocodylus australis, Bravard (foss.), appears to be based on remains (from the Tertiary of Parana) of two species, an *Alligator* and a Gavial, for which the name of *Rhamphostoma neogæa*, n. sp. (p. 151), is proposed; Burmeister, *An. Mus. B. Aires*, iii, pp. 148-152.

Tomistoma. Melitosaurus champsoides, Owen (Miocene of Malta), *Crocodylus gaudensis*, Hulke (Miocene of Gozo, near Malta), and *Gavia-lsuchus eggenburgensis*, Toulà (Miocene of Eggenburg, Austria), are referred to this genus by Lydekker, *Q. J. Geol. Soc.* xlii, pp. 20-22. *T. champsoides* figured, pl. ii.

Gavialis gangeticus, Gm. : on fossil remains from the Siwalik Hills ; Lydekker, *Pal. Ind.* (10) iii, p. 220, pl. xxx. *G. leptodus*, Falc. & Cautl. (foss.), described ; *id. ibid.* p. 226, pl. xxxii, figs. 2-4. *G. hysudricus*, p. 222, pls. xxxi, figs 3 & 4, & xxxii, fig. 1, *curvirostris*, p. 224, pl. xxxi, figs. 1-3, and *pachyrhynchus*, p. 227, pl. xxxiii, figs. 1, 2, & 4, n. spp., *id. ibid.*, Siwalik Hills.

Rhamphosuchus, n. g. Skull elongated into a rostrum ; teeth numerous ; nasals apparently separated from the premaxillæ ; 1st mandibular tooth biting into a notch, and 4th into a pit in the cranium ; maxillary teeth biting entirely on the outer side of the mandibular ; splenial entering largely into mandibular symphysis ; extremity of rostrum not expanded, facial profile straight. Lydekker, *t. c.* p. 229. For *R. crassidens*, Falc. & Cautl. (foss.), p. 230, pls. xxxiii, fig. 5, & xxxiv.

Goniopholis undidens, n. sp. (foss.), for a tooth from the Upper Jurassic of Wimille, N. France ; de la Moussaye, *Bull. Soc. géol.* (3) iii [1885], p. 53, figs.

Hyposaurus derbianus, n. sp. (foss.), Cope, *P. Am. Phil. Soc.* xxiii, p. 15, Brazil.

ICHTHYOSAURIA.

BAUR, G. Bemerkungen über *Sauropterygia* und *Ichthyopterygia*. *Zool. Anz.* ix, pp. 245-252.

The extremities of *Ichthyosauria* and *Plesiosauria* do not represent a primitive structure ; like the extremities of the Cetaceans, they are secondary structures, produced by adaptation to aquatic life. In other words, the ancestors of these marine types were terrestrial Reptiles.

THOMPSON, D'ARCY W. On the Hind Limb of *Ichthyosaurus*, and on the Morphology of Vertebrate Appendages. *Rep. Brit. Ass.* 1885, pp. 1065 & 1066, and *J. Anat. Phys.* xx, pp. 532-535, figs.

The hind limb of *Ichthyosaurus* (*platyodon*) is regarded as perhaps the most primitive limb known in Vertebrates above fishes.

WOODWARD, A. S. Note on the Presence of a Columella (Epipterygoid) in the Skull of *Ichthyosaurus*. *P. Z. S.* 1886, pp. 405-408, figs.

Ichthyosaurus quadriscissus, Quenst. Notes on and photograph of a very perfect specimen in the Lausanne Museum ; *Bull. Soc. Vaud.* (2) xxi [1885], pp. 8-12, pl. i.

PLESIOSAURIA.

See BAUR, *suprà*. The author, p. 246, proposes to establish a new family, *Macromirosauridae*, for *Macromirosaurus*, Curioni, and *Neusticosaurus*, Fraas.

Plesiosaurus, Con. H. Schröder describes remains of *P. helmersenii*, Kiprij., p. 310, pl. xv, and *ichthyospondylus*, Seeley, p. 315, pl. xvi fig. 2, from the Upper Chalk of the Baltic, and *P. helmersenii* (?), p. 325,

pl. xv, fig. 3, from the Chalk of Sweden : JB. Preuss. geol. Landes-Anstalt, 1884 [1885]. *P. balticus*, n. sp., *id. ibid.* p. 297, pls. xiii & xiv, Upper Chalk of the Baltic.

Pliosaurus ? *gigas*, n. sp., Schröder, *t. c.* p. 322, pl. xvi fig. 1, Upper Chalk of the Baltic.

W. DEECKE describes and figures a specimen of *Lariosaurus balsami*, Cur., pp. 172–189, pls. iii & iv, and makes remarks on *Pachypleura edwardsi*, Corn., and *Macromerosaurus plinii*, Cur., pp. 189–194 : Z. geol. Ges. xxxviii.

Cyamodus tarnowitzensis, n. sp., Gürich, JB. schles. Ges. 1884, p. 218 [1885], Muschelkalk of Silesia.

Pleurodus, n. g., of doubtful position, for teeth bearing some resemblance to those of *Placodus*. *P. bicolor*, n. sp., *id. ibid.* p. 220, Muschelkalk of Silesia.

RHYNCHOCEPHALIA.

G. BAUR criticises the nomenclature of certain bones of the skull of *Hatteria* in the article on the Anatomy of *Reptilia* in *Encycl. Brit.*, attributing this article to A. Günther ; Zool. Anz. ix, p. 635. Günther, *t. c.* p. 746, points out Baur's mistake, protesting at the same time against the use of the name *Sphenodon* instead of *Hatteria*.

Hatteria punctata. G. BAUR has found vomerine teeth in a young specimen ; Zool. Anz. ix, p. 685. On the cervical ribs ; Baur, Am. Nat. xx, pp. 979–981. Note in reply to some criticism of Baur (Am. Nat. p. 466) relating to the above subject ; A. Fritsch, Am. Nat. xx, p. 736. On the intercentra : Cope, Am. Nat. xx, p. 175 ; Baur, *t. c.* p. 465. G. BAUR remarks on the two ossa centralia in the carpus of *Hatteria* ; Zool. Anz. ix, p. 188 : also on the presence of hypapophysis (intercentra) between all the vertebræ ; *t. c.* p. 190. BAUR also writes on the vertebral column and the columella (epipterygoid) of *Hatteria* ; Am. Nat. xx, pp. 733–738. Notes on habits ; A. Reischek, Tr. N. Z. Inst. xviii, pp. 108–110. *Sphenodon diversum*, n. sp., for some bones from Hawke's Bay, New Zealand ; W. Colenso, Tr. N. Z. Inst. xviii, p. 118.

*LEMOINE, V. Nouvelle note sur le genre *Simœdosaurus* de la faune cernaysienne des environs de Reims, à propos de récentes publications de MM. Cope et Dollo sur le genre *Champsosaurus*. Reims : 1885, 8vo, 16 pp.

Champsosaurus, Cope (foss.). Further discussion between Lemoine and Dollo : Rev. Quest. Sci. xix, pp. 189–192. On *Simœdosaurus*-remains from the Lower Eocene of Sizanne, France : Lemoine, Bull. Soc. géol. (3) xi, pp. 21–32.

LACERTILIA.

ANDERSON, R. J. On the so-called Pelvisternum of certain Vertebrates. P. Z. S. 1886, pp. 163–165.

Contains notes on the pelvis of some *Lacertilia*.

STEINER, J. Ueber das Centralnervensystem der grünen Eidechse. SB. Ak. Berlin, 1886, pp. 539-542.

LEYDIG, F. Muthmassliche Lymphherzen bei *Pseudopus*. Zool. Anz. ix, pp. 317 & 318.

WIEDERSHEIM, R. Das Respirations-system der Chamäleoniden. Ber. Nat. Ges. Freiburg, i, Heft 3, 16 pp., pls. ii & iii.

GECKONIDÆ.

G. BAUR has found hypapophyses (intercentra) between the vertebræ of Geckos (*Gecko verticillatus*) as in *Hatteria*; Am. Nat. xx, p. 174, and Zool. Anz. ix, p. 190.

Nephurus laevis, n. sp., De Vis, P. Linn. Soc. N. S. W. (2) i, p. 168, Queensland. *N. platyurus*, n. sp., Boulenger, Ann. N. H. (5) xviii, p. 91, Adelaide.

Ptenopus garrulus, Smith. Notes by Böttger, Ber. Senck. Ges. 1886, p. 10.

Diplodactylus tænicauda, n. sp., De Vis, t. c. p. 169, Chinchilla, Queensland.

Hemidactylus greeffii, n. sp., Bocage, J. Sci. Lisb. No. xlii, pp. 66, 71, & 103, S. Thomé.

Lygodactylus capensis, Smith. Note on a specimen from the Kalahari; Böttger, t. c. p. 21.

Lepidodactylus guppyi, Blgr., described and figured: Boulenger, Tr. Z. S. xii, p. 38, pl. vii fig. 1.

Ptychozoon homalocephalum, Kuhl, F. H. Bauer relates that a female laid two eggs in November, which were not hatched until the middle of May; P. Z. S. 1885, p. 718.

Sphærodactylus homolepis, n. sp., Cope, P. Am. Phil. Soc. xxiii, p. 277, Nicaragua.

EUBLEPHARIDÆ.

Eublepharis variegatus, Baird. On its habits; Cope, Am. Nat. xx, p. 735.

AGAMIDÆ.

Agama atra, Daud: Note by Böttger, Ber. Senck. Ges. 1886, p. 12. *A. rudrata*, Oliv., p. 59, and *caucasica*, p. 61: Notes on specimens from Rasano, Talsch; Böttger, in Radde, Faun. Casp.-Geb. *A. boulengeri*, n. sp., Lataste, Le Nat. iii, p. 212, Upper Senegal.

Phrynocephalus persicus, De Fil. Notes on specimens from Rasano, Talsch; Böttger, in Radde, op. cit. p. 63.

Chlamydosaurus, Gray. On the shape of the interclavicle; Dollo, Rev. Quest. sci. xix, p. 318.

Amphibolurus muricatus, Shaw, pl. cxi, and *barbatus*, Kaup, pl. cxxi, described and figured by McCoy, Prodr. Zool. Vict.

Uromastix acanthinurus, Bell. On habits: J. v. Fischer, Zool. Gart. xxvii, pp. 146-149; A. v. Feoktistow, t. c. pp. 340-350.

IGUANIDÆ.

Anolis macropus, n. sp., Cope, P. Am. Phil. Soc. xxiii, p. 101, Pebas, Upper Amazon [= *A. leptoscelis*, Blgr.—REC.].

E. D. COPE gives a synopsis of the species of the genera *Cyclura*, *Ctenosaura*, *Cachryx*, *Brachylophus*, *Iguana*, *Conolophus*, and *Amblyrhynchus*, which he considers to form a subfamily, *Iguaninæ*. P. Am. Phil. Soc. xxiii, pp. 261–271.

Cyclura (*Metopoceros*) *cornuta*, Daud. Note by Cope, t. c. p. 263.

Ctenosaura multispinis, p. 267, and *brevirostris*, p. 268, n. spp., Cope, t. c.; Mexico. *C. teres brachylopha*, n. subsp., id. t. c. p. 269, Mazatlan. *C. erythromelas*, n. sp., Boulenger, P. Z. S. 1886, p. 241, pl. xxiii, habitat unknown: this form connecting the genera *Ctenosaura*, Wgm., and *Cachryx*, Cope, they are proposed to be united.

ANGUIDÆ.

Ophisaurus apus, Pall. On a specimen from Lenkoran; Boettger, in Radde, Faun. Casp.-Geb. p. 56.

Diploglossus (*Celestus*) *ohlendorffii*, n. sp., Fischer, JB. Hamb. iii, pl. —, fig. 1, San Domingo [= *D. striatus*, Gray.—REC.].

Anguis fragilis var. *orientalis*, Aud. On specimens from Lenkoran; Boettger, t. c. p. 58.

VARANIDÆ.

Varanus sivalensis, Fal. (foss.), described and figured by Lydekker, Pal. Ind. (10) iii, p. 236, pl. xxxv, fig. 1.

TEIIDÆ.

Cnemidophorus sexlineatus, L. Remarks on varieties; Cope, P. Am. Phil. Soc. xxiii, p. 283.

E. D. COPE gives a synopsis of the genera of Cercosaurine *Teiida*; t. c. p. 97.

Leposoma picticeps, n. sp., id. t. c. p. 99, Upper Amazon [= *Arthrosaura reticulata*, O'Sh.—REC.].

Mionyx, n. g. First toe of both anterior and posterior extremities with rudimental straight claw; claws of other digits small, straight, and conical. Prefrontal and frontoparietal plates present and distinct from each other. Ear-drum exposed. No distinct collar. Femoral pores present. Pholidosis squamous, nearly homogeneous. *M. parietalis*, n. sp., id. t. c. p. 96, Pebas, Upper Amazon.

LACERTIDÆ.

BEDRIAGA, J. v. Beiträge zur Kenntniss der Lacertiden-Familie (*Lacerta*, *Algiroides*, *Tropidosaura*, *Zerzumia*, und *Bettaia*). Abh. Senck. Ges. xiv, pp. 17–444, pl. —.

An extensive monograph of the genus *Lacerta*, which is divided in the five above-named subgenera, *Bettaia* being a new subgenus [= *Nucas*,

Gray.—REC.] for *Lacerta delalandii*. The plate is devoted to whole figures of *Lacerta peloponnesiaca*, Bibr., and *L. taurica*, Pall., and to details of other species. The following are the new names introduced : *L. viridis*, n. varr. *trilineata*, p. 99, Balkan Peninsula to Syria, and *villanti*, p. 100, Persia ; *L. paradoxa*, n. sp., p. 170, Russia and Transcaucasia [= race of *L. agilis*.—REC.] ; *L. muralis* subsp. *steindachneri* [= *L. oxycephala* var. *hispanica*, Stdr.], p. 256 ; *L. depressa*, n. varr. *rudis* and *modesta*, p. 275 ; *L. græca*, n. sp., p. 290, Greece [= *L. danfordi*, Gthr.—REC.] ; *L. cameranoi*, n. sp., p. 378, Mozambique [= *L. tessellata*, Smith.—REC.] ; *Algiroides moreoticus*, n. subsp. *doriae*, p. 404, Zante ; *Tropidosaurura algira* n. var. *doriae*, p. 425, Is. Galitone (between Sardinia and the coast of Africa).

Lacerta praticola, Eversm., p. 36, *viridis* var. *strigata*, Eichw., p. 39, *brandti*, De Fil., p. 42, and *muralis* var. *defilippi*, Cam., p. 44 : descriptions of specimens from the Talysch district ; Böttger, in Radde, Faun. Casp.-Geb. *L. viridis*, Laur. : on a melanotic form ; Camerano, Boll. Mus. Torino, i, No. 11. *L. muralis*, Laur. : the form described by Camerano as *L. taurica* subsp. *genei* is now regarded as belonging to this species ; *id. t. c.* No. 7. *L. muralis* var. *melisellensis*, Braun : notes by M. Braun, Zool. Anz. ix, p. 426.

Notopholis nigropunctata, D. & B., figured, with notes, by Ninni, Atti Soc. Ital. xxix, pp. 339–343, pl. xiii.

Gastropholis, n. g., distinguished from *Lacerta* by the keeled ventral shields. *G. vittata*, n. sp., Fischer, Abh. Ges. Hamb. ix, Heft. 1, pl. i, fig. 1, Zanzibar.

Ophiops elegans, Mén. Notes on specimens from Rasano, Talysch ; Böttger, in Radde, Faun. Casp.-Geb. p. 48.

Eremias velox var. *persica*, Blanf., p. 50, and *arguta*, Pall., p. 54. Notes on specimens from Rasano, Talysch ; *id. t. c.*

Scapteira depressa, Merr., described by Böttger, Ber. Senck. Ges. 1886, p. 12.

SCINCIDÆ.

Corucia zebrata, Gray, described and details figured ; Boulenger, Tr. Z. S. xii, p. 43, pl. vii, fig. 3.

Euprepes cupreus, n. sp., Fischer, JB. Hamb. iii, pl. —, fig. 2, S. Thomé I., Guinea [= *E. raddoni*, Gray.—REC.]. *E. (Tiliqua) ruhstrati*, n. sp., Fischer, Abh. Ges. Hamb. ix, Heft. 1, pl. i, fig. 2, S. Formosa [= *Eumeces siamensis*, Gthr.—REC.]. *Eumeces serratus*, pl. ii, fig. 3, Murray I., Torres Straits [= *Scincus atrocostatus*, Less.—REC.], and *microlepis*, pl. ii, fig. 4, Samoa [= *E. adspersus*, Stdr.—REC.], n. spp., *id. t. c.*

Lipinia anolis, Blgr., described and figured ; Boulenger, Tr. Z. S. xii, p. 40, pl. vii, fig. 2.

Ablepharus bivittatus, Mén. Notes on specimens from Rasano, Talysch ; Böttger, in Radde, Faun. Casp.-Geb. p. 57.

Tropidophorus sinicus, n. sp., *id.* Zool. Anz. ix, p. 519, S. China.

Scincus muscatensis, n. sp., J. A. Murray, Ann. N. H. (5) xvii, p. 67, Muscat, Arabia.

CHAMÆLEONTIDÆ.

G. BAUR, Zool. Anz. ix, pp. 685 & 686, has some remarks on the osteology of the Chamæleons, viz., on the presence of a proatlas in *Chamæleon vulgaris*; on the supratemporal, which is the bone named parietal by Parker and epiotic by Dollo; and on the pelvic arch, the cartilaginous part homodynamic of the suprascapula receiving the name of suprailium.

Chamæleon calcarifer, Ptrs., occurs near Aden; Yerbury, P. Z. S. 1885, pp. 717 & 833.

MOSASAURIDÆ.

Mosasaurus. On remains from the Chalk of the Baltic coast of Germany and from Sweden; Schröder, JB. Preuss. geol. Landes-Anstalt, 1884 [1885], pp. 324-327. *M. scanicus*, n. sp., *id. t. c.* p. 328, Chalk of Sweden.

Leiodon lundgreni, n. sp., *id. t. c.* p. 329, pl. xvii, fig. 9, Chalk of Sweden.

OPHIDIA.

COPE, E. D., An Analytical Table of the Genera of Snakes. P. Am. Phil. Soc. xxiii, pp. 479-499.

The arrangement of the families and higher groups is, with slight modification, that published by the author in 1864.

CARLSSON, A. Die Extremitätenreste bei einigen Schlangen. Abstract in Anat. Anz. i, p. 189.

Remains of a shoulder-musculature are found in a few Snakes.

LOCKINGTON remarks on the shape of the pupil in Snakes. P. Ac. Philad. 1886, p. 300.

RICHARDS, V. The Land-Marks of Snake-Poison Literature, being a Review of the more important Researches into the Nature of Snake-Poisons. Calcutta: 1885, 16mo, 176 pp.

WOLFENDEN, R. N. On the Nature and Action of the Venom of Poisonous Snakes. I. The Venom of the Indian Cobra (*Naja tripidians*). J. Physiol. vii, pp. 327-356. II. A Note upon the Venom of the Indian Viper (*Daboia russellii*). T. c. pp. 357-364.

— On "Cobric Acid," a so-called Constituent of Cobra Venom. T. c. pp. 365-370.

On the rearing of Snakes' eggs; J. v. Fischer, Zool. Gart. xxvii, pp. 299-302.

UROPELTIDÆ.

R. H. BEDDOME, Ann. N. H. (5) xvii, pp. 3-33, publishes an account of the Snakes of this family, of which 39 species are distinguished, 3

being new. They are referred to 7 genera, one of which is established for the first time.

Silybura nilgherriensis, Bedd. (= *ceylanica*, Cuv.), n. varr. *annulata*, Wynad, *myhendrae*, South Travancore, and *picta*, North Travancore; Beddome, t. c. pp. 15 & 16.

Plectrurus davidsoni, p. 25, Anamallays, 4700 feet, and *scabricauda*, p. 27, Anamallays, n. spp., *id. t. c.*

Teretrurus, n. g. Tail tapering; the terminal scute a single sharp point; no median groove along the chin. *Id. t. c.* p. 28. For *Plectrurus sanguineus*, Bedd., and *T. travancoricus*, n. sp., *id. t. c.* p. 29, between Travancore and Tinnevely, 3000-5000 feet.

Platyplectrurus bilineatus, n. sp., *id. t. c.* p. 33, Madura.

BOIDÆ.

E. D. COPE remarks on the characters of three problematical genera of Mexican Boæform Snakes, viz., *Charina*, Gray, *Lichanura*, Cope, and *Loxocemus*, Cope. A new family, *Charinidæ*, is established for the first, the two others being referred to the *Pythonidæ* and *Boidæ* respectively. Am. Nat. xx, pp. 293 & 294.

Eryx jaculus, L. On a specimen from Rasano, Talsch; Boettger, in Radde, Faun. Casp.-Geb. p. 73.

Python molurus, L. On fossil remains from the Siwalik Hills; Lydekker, Pal. Ind. (10) iii, p. 237, pl. xxxv, figs. 4-7.

COLUBRIDÆ.

Chionactis diasii, n. sp. (= *Conopsis lineatus*, Bocourt, nec Kenn.), Cope, P. U. S. Nat. Mus. 1886, p. 188, Puebla, Mexico.

Ogmis acutus, n. sp., *id. t. c.* p. 189, Tehuantepec.

Rhabdosoma longiceps, n. sp., *id. t. c.* p. 189, Vera Cruz, Mexico.

Geophis fuscus, n. sp., Fischer, Abh. Ges. Hamb. ix, Heft 1, pl. ii, fig. 5, Mexico.

Stenorhina degenhardtii, Berth., p. 594, fig. 7, and var. *kennicottiana*, Cope, p. 595, fig. 9, *freminvillei*, D. & B., p. 596, fig. 8, and var. *apiata*, Cope, p. 597, fig. 10, and *quinguelineata*, Hallow., p. 597, fig. 11, described and figured by Bocourt, Miss. Sci. Mex., *Rept.*, pl. xxxvii.

Rhinocheilus lecontei, B. & G., described and figured by Bocourt, t. c. p. 602, pl. xl, fig. 7. *R. antonii*, n. sp., A. Dugès, P. Am. Phil. Soc. xxiii, p. 290, fig., Mazatlan.

Simotes formosanus, Gthr.: note by Fischer, Abh. Ges. Hamb. ix, Heft 1. *S. herzi*, n. sp., Boettger, Zool. Anz. ix, p. 519, S. China.

Oligodon subpunctatus, D. & B.? Note by G. Vidal, J. Bomb. Soc. i, p. 144.

Tripeltis, n. g. Type, *Oligodon brevicaula*, Gthr. Cope, P. Am. Phil. Soc. xxiii, p. 487.

Holarchus, n. g., embracing all species with entire anal plate, hitherto referred to *Simotes*; *id. t. c.* p. 488.

Henicognathus annulatus, D. & B., p. 626, pl. xl, fig. 6, *vittatus*, Jan., p. 630, pl. xli, fig. 1, and *godmani*, Gthr., p. 631, pl. xl, fig. 5, described

and figured by Bocourt, *t. c.*; *H. sumichrasti*, n. sp., *id. t. c.* p. 628, pl. xli, fig. 5, Tehuantepec.

Diadophis punctatus, L., p. 618, pl. xl, fig. 1, and varr. *docilis*, B. & G., p. 619, *amabilis*, B. & G., p. 620, *pulchellus*, B. & G., p. 620, *pallidus*, Cope, p. 621, *dysopes*, Cope, p. 621, *arnyi*, Kenn., p. 622, *letus*, Jan, p. 622, *modestus*, n. var., p. 623, California, and *regalis*, B. & G., p. 624, and *D. decoratus*, Gthr., p. 624, pl. xl, fig. 3, described by Bocourt, *t. c.*

Rhadinea nicaga, Cope, redescribed; Cope, P. Am. Phil. Soc. xxiii, p. 102. *R. quinquelineata*, n. sp., *id. t. c.* p. 277, Hidalgo, Mexico. *R. fulviceps*, n. sp., *id. t. c.* p. 279, Panama.

Coniophanes fissidens, Gthr., p. 650, pl. xli, fig. 3, and var. *punctigularis*, Cope, p. 652, *bipunctatus*, Gthr., p. 653, pl. xl, fig. 8, *proterops*, Cope, p. 654, *lateritius*, Cope, p. 655, and *piceivittis*, Cope, p. 656, pl. xli, fig. 2, described by Bocourt, *t. c.*

Coronella austriaca, Laur.: notes on the Smooth Snake in England; O. P. Cambridge, P. Dorset N. H. Club, vii, pp. 84-92, pl. vi: on specimens from Rasano, Talysch; Boettger, in Radde, Faun. Casp.-Geb. p. 67. *C. coccinea*, Schleg., p. 608, fig. 1, *doliata*, L. p. 609, fig. 2, and varr. *gentilis*, B. & G., p. 610, fig. 5, and *conjuncta*, Jan, p. 611, fig. 6, *formosa*, Schleg., p. 612, fig. 3, and varr. *anomala* s. *abnorma*, n. var., p. 614, fig. 4, *oligozona*, n. var. (= *Ophibolus polyzonus*, Sumichr., nec Cope), p. 614, fig. 8, and *polyzona*, Cope, p. 615, fig. 7, described and figured by Bocourt, *t. c.* pl. xxxix. *C. multifusciata*, n. sp., *id. t. c.* p. 616, pl. xl, fig. 2, California.

Liophis reginae var. *albiventris*, Jan, p. 633, pl. xli, fig. 4, and *elapoides*, Cope, p. 635, pl. xli, fig. 6, and varr. *diastema*, n. var., p. 636, fig. 8, and *aqualis*, Gthr., p. 637, fig. 7, described and figured by Bocourt, *t. c.*

Erythrolamprus venustissimus, Wied., described and figured by Bocourt, *t. c.* p. 658, pl. xxxviii, fig. 4.

Rhinechis scalaris, Schinz. On habits; A. v. Feoktistow, Zool. Gart. xxvii, pp. 177-185; J. v. Fischer, *t. c.* pp. 286-288.

Conophis lineatus, D. & B., p. 643, pl. xxxviii, fig. 5, *vittatus*, Ptrs., p. 644, fig. 7, and *pulcher*, Cope, p. 646, fig. 6, and n. var. *similis*, p. 647, described and figured by Bocourt, *t. c.*

Heterodon nasicus, B. & G., p. 604, pl. xxxviii, fig. 1, and var. *kennerlyi*, Kenn., p. 606, fig. 2, described and figured by Bocourt, *t. c.*

Xenodon severus var. *angustirostris*, Ptrs., described and figured by Bocourt, *t. c.* p. 638, pl. xxxviii, fig. 3.

Elaphis quateradiatus, Latr. Observations on oviposition and artificial incubation; Peracca, Boll. Mus. Torino, i, No. 16.

Bothrophthalmus modestus, n. sp., Fischer, Abh. Ges. Hamb. ix, Heft 1, Camaroon.

Dipsina multimaculata, Smith. Notes by Boettger, Ber. Senck. Ges. 1886, p. 4.

Psammophis sibilans, L. Note on a specimen from Angra Pequena; Boettger, *t. c.* p. 5.

Tropidonotus tessellatus, Laur., var. *hydrus*, Pall. On a specimen from Lenkoran; Boettger, in Radde, Faun. Casp.-Geb. p. 71.

Eutania multimaculata, Cope. Note by Cope, P. Am. Phil. Soc. xxiii, p. 284.

Bothrodytes, n. g., for *Amphiesma subminiatus*, Reinw., and *A. tigrinum*, Boie. Cope, *t. c.* p. 495.

Grayia giardi, n. sp., Dollo, Bull. Mus. Belg. iv, p. 158, figs., Tanganika district.

Hypsirhina polylepis, n. sp., Fischer, Abh. Ges. Hamb. ix, Heft 1, Fly River, New Guinea.

Homalopsidarum gen. ? described by F. Dreckman, J. Bomb. Soc. i, p. 24, Central Provinces, India, = *Ferania sieboldi*, Schleg. ; Murray, *t. c.* p. 219.

Herpetodryas melas, n. sp., Cope, P. Am. Phil. Soc. xxiii, p. 278, Nicaragua.

Dendrophidium chloroticum, n. sp., *id. t. c.*, Guatemala.

Ophites rukstrati, n. sp., Fischer, Abh. Ges. Hamb. ix, Heft 1, pl. ii, fig. 6, Formosa.

Cynophis mællendorffi, n. sp., Boettger, Zool. Anz. ix, p. 520, S. China.

Leptognathus stratissima, n. sp., Cope, P. Am. Phil. Soc. xxiii, p. 280, Panama.

Sibon frenatum, n. sp., Cope, P. U. S. Nat. Mus. 1886, p. 184, Jalapa, Mexico.

Tarbophis vivax, Fitz. On a specimen from Rasano, Talysch ; Boettger, in Radde, *op. cit.* p. 72.

Trimorphodon, D. & B. Synopsis of the species by Cope, P. Am. Phil. Soc. xxiii, p. 286. *T. willinsonii*, n. sp., *id. t. c.* p. 285, Chihuahua, Mexico.

ELAPIDÆ.

A. B. MEYER has further remarks on the extremely large poison-glands, extending in the abdominal cavity, of certain small Elapoid Snakes, formerly confounded under the name of *Callophis*. He gives a list of the species which are provided with such glands (*Adeniophis*, Peters), and of those in which they are of normal size (*Callophis*, *Hemibungarus*, and *Megarophis*). SB. Ak. Berlin, 1886, pp. 611-614.

Hoplocephalus par, Blgr., described and figured ; Boulenger, Tr. Z. S. xii, p. 46, pl. vii, fig. 4.

Boulengerina, n. g., allied to *Naia*. A series of 3 or 4 solid teeth behind the poison-fangs: rostral moderate ; 2 nasals, second in contact with the præocular ; 2 postoculars ; neck non-distensible ; scales not arranged obliquely, smooth, in 21 series ; anal single ; subcaudals double. Dollo, Bull. Mus. Belg. iv, p. 159. *B. stormsi*, n. sp., *id. t. c.* p. 160, figs., Tanganika district.

Naia oxiana, Eichw. Note by Nikolsky ; Tr. St. Petersburg. Soc. Nat. xvii, p. 405.

Atractaspis leucura, n. sp., Mocquard, Bull. Soc. Philom. (7) x, p. 14, Assinie, Gold Coast.

HYDROPHIIDÆ.

Remarks on habits of Sea-Snakes ; Kneeland, P. Bost. Soc. xxiii, p. 163.

VIPERIDÆ.

Vipera berus, L.: notes on its distribution in Germany; J. Notthafft, Zool. Anz. ix, pp. 450-454: remarks on habits, distribution, &c., with special reference to Pomerania; L. Holtz, MT. Vorpomm. xvii, pp. 45-62. *V. caudalis*, Smith: notes by Boettger; Ber. Senck. Ges. 1886, p. 6. *V. schneideri*, n. sp., *id. t. c. p. 8*, pl. i, fig. 1, Angra Pequena.

Crotalus horridus, L. Notes on its occurrence in New England; Packard, Am. Nat. xx, pp. 736 & 737.

Trigonocephalus halys, Pall. Notes on specimens from the Talysch district; Boettger, in Radde, Faun. Casp.-Geb. p. 74.

Bothrops. T. W. van Lidth de Jeude discusses the characters and synonymy of *B. wagleri*, Boie, and *B. sumatranus*, Raffles; Notes Leyd. Mus. pp. 43-54. *B. hageni*, n. sp., *an B. sumatranus*, juv.? *id. t. c. p. 54*, Sumatra and Banka.

BATRACHIA.

BOULENGER, G. A. First Report on Additions to the Batrachian Collection in the Natural History Museum. P. Z. S. 1886, pp. 411-416, pl. xxxix.

A list of all the species of Batrachians added to the collection since the publication of the last edition of the Catalogue (1882), viz, 63 *Ecaudata*, 4 *Caudata*, and 7 *Apoda*. The list is followed by the descriptions of a few new species.

— . Quelques mots en réponse à la note de M. le Dr. R. Blanchard sur la classification des Batraciens. Bull. Soc. Z. Fr. xi, pp. 320 & 321. [*Cf. Zool. Rec. xxii, Rept. p. 22.*]

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SCHULTZE, O. Ueber Reifung und Befruchtung des Amphibieneies. Anat. Anz. i, pp. 149-152.

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HOFFMANN, C. K. Zur Entwicklungsgeschichte der Urogenitalorgane bei den Anamnia. Z. wiss. Zool. xlv, pp. 570-643, pls. xxxiii-xxxv. *Batrachia*, pp. 570-614.

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LENHOSSEK, M. v. Untersuchungen über die Spinalganglien des Frosches. Arch. mikr. Anat. xxvi, pp. 370-453, pls. xv & xvi.

DURHAM, H. E. Note on the Presence of a Neurenteric Canal in *Rana*. Q. J. Micr. Sci. xxvi, pp. 509 & 510, pl. xxvii.

HOWES, G. B. On some Abnormalities of the Frog's Vertebral Column (*Rana temporaria*). Anat. Anz. i, pp. 277-281, figs.

TUCKERMAN, F. Supernumerary Leg in a Male Frog (*Rana palustris*). J. Anat. Phys. xx, pp. 516-519, pl. xvi.

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Bufo vulgaris, *Hyla arborea*, *Rana esculenta*.

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On the effect of hunger, as accelerating the transformation of Tadpoles.

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G. A. BOULENGER, supplementing a note by H. v. Ihering on the oviposition of *Phyllomedusa iheringii*, brings together in a synoptic table the precise facts actually known respecting the mode in which tailless Batrachians deposit or protect their offspring; Ann. N. H. (5) xvii pp. 463 & 464.

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CERATOBATRACHIDÆ.

Ceratobatrachus guentheri, Blgr., described and figured; Boulenger, Tr. Z. S. xii, p. 56, pls. xii & xiii.

RANIDÆ.

Rana. A synonymic list of the North American species, by E. D. Cope, P. Am. Phil. Soc. xxiii, pp. 517-521. *R. areolata æsopus*, p. 517, Florida, *R. halecina sphenoccephala*, p. 517, S.E. North America, *brachycephala*, p. 517, Central and Sonoran districts, and *austriçola*, p. 517, Mexico, and *R. cantabridgensis latiremis*, p. 520, Alaska, n. subsp., *id. t. c.* *R. esculenta*, L., var. *ridibunda*, Pall.: on a specimen from Lenkoran; Bœttger, in Radde, Faun. Casp.-Geb. p. 76. *R. temporarie s. fusce*: Discussions:—Ninni, Atti Soc. Ital. xxviii, pp. 248-252; Lessona, Atti Acc. Tor. xxi, pp. 288-290; Boulenger, Ann. N. H. (5) xvii, pp. 248-250; Camerano, Zool. Anz. ix, pp. 195 & 196, Boll. Mus. Tor. i, No. 8, and Atti Ist. Venet. (6) iv, pp. 833-848; Héron-Royer, Bull. Soc. Zool. xi, pp. 681-690 [the latter contribution deals especially with the differences between *R. temporaria* (s. *fusca*) and *agilis* during the embryonic and larval periods]; De Betta, Conveniente risposta ad un Cenno critico del dott. Alessandro P. Ninni, Verona, 1886, 8vo. A. Borelli publishes researches on the osteological differences of the Italian species of *R. fusce*; Boll. Mus. Tor. i, No. 14. G. A. Boulenger, Bull. Soc. Z. Fr. xi, pp. 595-600, has a note on the Asiatic species of this group, of which he distinguishes 8, 3 being described for the first time, viz., *R. camerani*, p. 597, Caucasus, *R. amurensis*, p. 598, Amoor, and *R. martensii*, p. 599, Japan; the latter species is also described in P. Z. S. 1886, p. 414. G. Born indicates the differences between the larvæ of *R. temporaria* and *R. arvalis*: Arch. mikr. Anat. xxvii, p. 207. *R. arvalis*, Nilss.: remarks upon and figure of living specimens; Boulenger, P. Z. S. 1886, p. 242, pl. xxiv: the frog on which Haller observed the blue colouration during the breeding season is now believed to have been *R. arvalis* and not *R. temporaria*; Haller, Zool. Anz. ix, p. 12. *R. latastii*, Blgr., found in Piedmont; Peracca, Boll. Mus. Tor. i, No. 5. *R. agilis*, Thom.: on a specimen from Lenkoran; Bœttger, in Radde, *op. cit.* p. 77. *R. bufoniformis*, Blgr., p. 47, pl. viii, *guppyi*, Blgr., p. 48, pl. ix, and *opisthodon*, Blgr., p. 50, pl. x, described and figured; Boulenger, Tr. Z. S. xii: the latter species is shown to undergo the metamorphosis within the egg, as in *Hylodes martinicensis*. *R. krefftii*, Blgr., described; *id. t. c.* p. 52. *R. leybarensis*, n. sp., Lataste, Le Nat. iii, p. 230, Senegal. *R. newtonii*, n. sp., Bocage, J. Sci. Lisb. xlii, pp. 70 & 73, S. Thomé. *R. macropus*, n. n. for *Ixalus japonicus*, Hallow.; Boulenger, P. Z. S. 1886, p. 414.

Ixalus asper, n. sp., Boulenger, *t. c.* p. 415, pl. xxxix, fig. 1, Perak.

Cornufer guppyi, Blgr., p. 53, pl. xi, fig. 1, and *solomonis*, Blgr., p. 54, pl. xi, fig. 2, described and figured; Boulenger, Tr. Z. S. xii.

Rappia. *Hyperolius thomensis*, n. sp., Bocage, J. Sci. Lisb. xlii, p. 74, S. Thomé.

ENGYSTOMATIDÆ.

Engystoma pictiventre, n. sp., Cope, P. Am. Phil. Soc. xxiii, p. 272, Nicaragua.

CYSTIGNATHIDÆ.

Lithodytes bransfordii, p. 274, and *ranoides*, p. 275, n. spp., Cope, P. Am. Phil. Soc. xxiii, Nicaragua. *Hylodes polyptychus*, n. sp., *id. t. c.* p. 276, Nicaragua; *H. vertebralis*, n. sp., Boulenger, P. Z. S. 1886, p. 415, Intac, Ecuador.

BUFONIDÆ.

Bufo. On the dentiform processes on the palatine bone in certain species; Héron-Royer, Bull. Soc. Z. Fr. xi, pp. 324–327, fig. A synonymic list of the North American species, by E. D. Cope, P. Am. Phil. Soc. xxiii, pp. 514–516. *B. hemiophrys*, n. sp., *id. t. c.* p. 515, Montana.

HYLIDÆ.

Hyla macrops, Blgr., p. 59, pl. xi, fig. 3, and *thesaurensis*, Ptrs., p. 60, pl. xi, fig. 4, described and figured; Boulenger, Tr. Z. S. xii. *H. guentheri*, n. n. for *H. leucotenius*, Gthr., *nee* Burm.; Boulenger, Ann. N. H. (5) xviii, p. 445. *H. fuvosa*, n. sp., Cope, P. Am. Phil. Soc. xxiii, p. 95, Pebas, Upper Amazon. *Hypsiboas miliaris*, n. sp., Cope, *t. c.* p. 272, Nicaragua. *Hyla quinquevittata*, *id. t. c.* p. 273, Nicaragua. *H. microcephala*, n. sp., *id. t. c.* p. 281, Chiriqui.

Phyllomedusa iheringii, Blgr. H. v. Ihering describes the oviposition of this tree-frog: the eggs are laid in the open air on trees, between leaves hanging over the water, into which the larvæ ultimately drop; Ann. N. H. (5) xvii, p. 461, fig.

PELOBATIDÆ.

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On the species of *Pelobates* and *Pelodytes*.

Pelobates fuscus, Laur. Leydig remarks that Rusconi was the first discoverer of this Batrachian in Italy; Zool. Anz. ix, p. 291. Note on the same subject by Camerano, Boll. Mus. Tor. i, No. 9.

Pelodytes punctatus, Daud. On its occurrence in Piedmont (Castino); Peracca, Boll. Mus. Tor. i, No. 1.

Megalophrys longipes, n. sp., Boulenger, P. Z. S. 1885, p. 850, pl. lv, Perak.

Palæobatrachus, Tsch. (foss.). W. Wolterstorff, JB. Naturw. Ver. Magdeburg, 1886 (separate copy, 81 pp., 6 pls.), publishes extensive notes upon numerous species of this genus, some both in the larval and adult state. *P. fritschii*, p. 51, Brown Coal of Kaltennordheim, Rhön, and *luedeckei*, p. 67, Brown Coal of Markersdorf, Bohemia, and Zittau, in Saxony, n. spp., *id. t. c.*

DISCOGLOSSIDÆ.

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CAUDATA.

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Callorhynchus antarcticus, Lac., described and figured by McCoy, Prodr. Zool. Vict., pl. cxii.

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A comparison of the fins in the genera and species of *Dipnoi*. The genus *Protopterus* is regarded as valid, and *P. amphibius*, Peters, as specifically distinct from *P. annectens*.

FULLIQUET, G. Sur la structure du cerveau du *Protopterus annectens*. Arch. Sci. nat. (3) xv, pp. 94-96, and Rec. Z. Suisse, iii, pp. 1-130.

BEDDARD, F. E. Note on the Ovarian Ovum in the *Dipnoi*. Zool. Anz. ix, pp. 635-637.

Lepidosiren (*Protopterus*) and *Ceratodus*.

— Observations on the Ovarian Ovum of *Lepidosiren* (*Protopterus*). P. Z. S. 1886, pp. 272-292, pls. xxviii & xxix; also Zool. Anz. ix, pp. 373-375.

MACALLUM, A. B. The Alimentary Canal and Pancreas of *Acipenser*, *Amia*, and *Lepidosteus*. J. Anat. Phys. xx, pp. 604-636, pl. xx; abstr. in P. Canad. Inst. (3) iii, pp. 271-274.

WILDER, B. G. Experiments antagonizing the view that the serrulæ (serrated appendages) of *Amia* are accessory respiratory organs. P. Am. Ass. xxxiv, pp. 313-315.

Titanichthys, *Dinichthys*, and *Diplognathus* (foss.): notes by Newberry, Tr. N. Y. Ac. v, pp. 25-28. *T. agassizii*, n. sp., *id. t. c.*, Devonian of Ohio. *Dinichthys* possesses a series of sclerotic plates round the eye, like those of many Reptiles.

Coccosteus obtusus, Koen. (foss.). Note by A. v. Koenen, Verh. Ver. Rheinl. xliii, pp. 55-57, figs.

Pteraspis, *Cyathaspis*, and *Scaphaspis*: whether the shields referred to these three genera belong to different parts of the body of one and the

same form, must remain an open question; A. v. Alth, Beitr. Pal. Oesterr.-Ung. v, pp. 61-73, pl. xxiv. On shields of *Pteraspis* and *Scaphaspis* from Polole in Galicia; *id.* Mém. Ac. Cracov. xi, pp. 160-187, pl. vi.

P. ALBRECHT describes and figures a specimen of *Protopterus annectens*, in which the right pectoral fin bifurcates in two long branches; SB. Ak. Berlin, 1886, pp. 545 & 546, pl. vi.

Ceratodus. On the first fossil skull, from the Upper Trias of Pölzberg, near Lunz; D. Stur, Verh. Geol. Reichsanst. 1886, pp. 381-383. Remarks on fossil teeth; Zittel, SB. bayer. Ak. 1886, pp. 253-261, pl. —.

Pycnodus flabellatus, n. sp. (foss.), Cope, P. Am. Phil. Soc. xxiii, p. 6, Prov. Sergipe del Rey, Brazil, probably Cretaceous.

Lepidotus, Ag. Notes on various Wealden species; Branco, JB. Preuss. geol. Landes-Anstalt, 1884 [1885], pp. 181-200, pls. viii & ix. *L. degenhardti*, n. sp., *id.* *ibid.* p. 183, pls. viii & ix, fig. 1, Wealden of Obernkirchen, Germany. *L. gigas*, Ag. (foss.): figure of a specimen from Rothersthorpe, Northamptonshire; B. Thompson, J. Northampton Soc. v, p. 27, pl.

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TELEOSTEI.

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On variations of colour, according to surroundings, in various Teleosteans.

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- *USSOW, M. On the Structure of the so-called Lobi accessorii of the Spinal Marrow in some Teleostean Fishes. Tr. Nat. Soc. Kasan, xv, 69 pp. (Russian).
- FRITSCH, G. Ueber einige bemerkenswerthe Elemente des Centralnervensystems von *Lophius piscatorius*, L. Arch. mikr. Anat. xxvii, pp. 13-31, pls. iii & iv, and Tag. Deut. Nat. Vers. lix, p. 376.
- MATTHIESSEN, L. Ueber den physikalisch-optischen Bau des Auges der Cetaceen und der Fische. iv. Das Auge vom Wels (*Siluris glanis*). Arch. ges. Physiol. xxxix, pp. 204-208.
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- . Die Gastrulation und die sogenannte Allantois bei den Teleostiern. SB. Soc. Erlangen, Heft 18, pp. 31-36, pl. —.
- RYDER, J. A. The Development of the Mud-Minnow (*Umbra limi*). Am. Nat. xx, pp. 823 & 824.
- . The Development of *Fundulus heteroclitus*. T. c. p. 824.
- PRINCE, E. E. Early Stages in the Development of the Food-Fishes. Ann. N. H. (5) xvii, pp. 443-461.
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- . On the Presence of Oleaginous Spheres in the Yolk of Teleostean Ova. Ann. N. H. (5) xviii, pp. 84-90.
- SCHARFF, R. On the Intra-ovarian Egg of some Osseous Fishes. Abstract. P. R. Soc. xl, pp. 447-449.

ACANTHOPTERYGII.

PERCIDÆ.

- *BORNE BERNEUCHEN, M. VON DEM. Der Schwarzbarsch und der Forelenbarsch (Black Bass) (*Micropterus salmoides* and *dolomieu*), ihr wirtschaftlicher Werth und ihre Züchtung. Berlin: 1886, 8vo, 8 pp., figs.
- Etheostoma squamiceps*, Jord., described by Bollman, P. U. S. Nat. Mus. 1886, p. 464. *E. zonale arcansarum*, n. subsp., Jordan & Gilbert, P. U. S. Nat. Mus. 1886, p. 5, Arkansas.
- Hadropterus scierus*, Swain, n. var. *serrula*, Jordan & Gilbert, t. c. p. 16, Sabine River, Texas.
- Centropristes atrobranchus*, C. & V., *brasiliensis*, Barnev., and *rufus*, C. & V. Notes on the type specimens; Jordan, t. c. pp. 532 & 533.
- Aylopon* (= *Anthias*) *martinicensis*, Guich. Note on the type specimens; Jordan, t. c. p. 533.

Serranus undulosus, C. & V., and *niveatus*, C. & V.: notes on the type specimens; Jordan, *t. c.* p. 532. *S. ocyurus*, n. sp., Jordan & Evermann, *t. c.* p. 468, Gulf of Mexico.

Mesoprion cyanopterus, C. & V., *litura*, C. & V., *flavescens*, C. & V., *linea*, C. & V., *mahogoni*, C. & V., *ricardi*, C. & V., *cynodon*, C. & V., and *vivanus*, C. & V. Notes on the type specimens; Jordan, *t. c.* p. 534.

Lutjanus dentatus, A. Dum. Note on the type specimen; Jordan, *t. c.* p. 534.

Hæmulon canna, C. & V., and Ag., *caudimacula*, C. & V., *bonariense*, C. & V., *macrostoma*, Gthr., *chromis*, C. & V., and *chrysargyreum*, Gthr. Notes on the type specimens; Jordan, *t. c.* pp. 535 & 536.

Gerres. B. W. Evermann and S. E. Meek publish a revision of the (15) American species of the genus, with synonymy and analytical keys; P. Ac. Philad. 1886, pp. 256-272.

Scolopsis macrophthalmus, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 10, Port Moresby, New Guinea.

Ambassis gigas, n. sp., Ramsay & Douglas-Ogilby, *t. c.* p. 9, Strickland River, New Guinea.

Nematocentris novæ-guinæ, p. 13, and *rubrostriatus*, p. 14, n. spp., Ramsay & Douglas-Ogilby, *t. c.*, Strickland River, New Guinea.

Aprion virescens, C. & V. Note on the type specimen; Jordan, P. U. S. Nat. Mus. 1886, p. 535.

Apsilus fuscus, C. & V. Note on the type specimen; Jordan, *t. c.* p. 535.

SQUAMIPINNES.

Chaetodon aya, n. sp., Jordan, *t. c.* p. 225, Florida.

MULLIDÆ.

Mullus barbatus. On a live specimen encased in a colony of *Pyrosoma atlanticum*; Giglioli, *Nature*, xxxiv, p. 313.

Upeneus martinicus, C. & V. Note on the type specimen; Jordan, P. U. S. Nat. Mus. 1886, p. 539.

SPARIDÆ.

Sargus argenteus, C. & V., *ascensionis*, C. & V., *flavolineatus*, C. & V., *aries*, C. & V., *lineatus*, C. & V., and *fasciatus*, C. & V. Notes on the type specimens; Jordan, *t. c.* pp. 538 & 539.

Calamus plumatula, Guichen., and *microps*, Guichen. Notes on the type specimens; Jordan, *t. c.* p. 537.

Pimelepterus sydneyanus, n. sp., Günther, *Ann. N. H.* (5) xviii, p. 368, Port Jackson: this is the *Pachymetopon grande* of Macleay, *nec* Gthr.; the latter fish, with which *Pachymetopon guentheri*, Sldr., is probably identical, is from the Cape of Good Hope. *Pachymetopon squamosum*, MacL., = *Pimelepterus cinerascens*, Forsk.; *id. t. c.* pp. 367 & 368.

Capitodus indicus, Lyd. (foss.). Tooth figured by Lydekker, *Pal. Ind.* (10) iii, pl. xxxv, fig. 11.

CIRRHITIDÆ.

Cirrhitichthys aprinus, C. & V., described by Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. x, p. 575.

Chilodactylus morwong, n. sp., Ramsay & Douglas-Ogilby, *t. c.* p. 879, Port Jackson.

Latris mortoni, n. sp., Saville-Kent, Rep. Fish. Tasm. 1886, p. 13, Tasmania.

SCORPÆNIDÆ.

RYDER, J. A. On the "Intraovarian Gestation of the Redfish (*Sebastes marinus*). Bull. U. S. Fish Comm. 1886, pp. 92-94.

Scorpena scrofa, C. & V., *brasiliensis*, C. & V., and *inermis*, C. & V. Notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, p. 545.

Sebastes scaber, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. x, p. 577, Shark Reef, Port Jackson.

TEUTHIDIDÆ.

Teuthis vitianus, n. sp., Sauvage, Bull. Soc. Philom. (7) vi, p. 173, Fiji.

BERYCIDÆ.

Trachichthys australis, Shaw, described and figured by McCoy, Prodr. Zool. Vict. pl. cxiv.

Myripristis carneus, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 474, Admiralty Islands.

POLYNEMIDÆ.

Polynemus californiensis, n. sp., Thominot, Bull. Soc. Philom. (7) x, p. 161, California.

SCIÆNIDÆ.

Umbrina martinicensis, C. & V., and *gracilis*, C. & V. Notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, p. 539.

Sciæna neglecta, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 941, New South Wales.

Corvina trispinosa, C. & V. Note on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, p. 540.

Otolithus guatucupa, C. & V., *leiarchus*, C. & V., and *nebulosus*, C. & V. Notes on the type specimens; *id. ibid.*

TRICHIURIDÆ.

Lepidopus caudatus, Gthr. Notes on the New Zealand Frost-Fish; W. Arthur, N. Z. J. Sci. ii, p. 157; C. H. Robson, *t. c.* p. 289.

CARANGIDÆ.

Caranx bartholomæi, C. & V., and *sexfasciatus*, Q. & G.. Notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, p. 531.

Seriola rivoliana, C. & V.: note on the type specimen; *id. t. c.* p. 532. *S. simplex*, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. x, p. 757, Port Jackson.

Trachynotus argenteus, C. & V., *cayennensis*, C. & V., and *paitensis*, C. & V. Notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, p. 531.

Equula smithursti, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 11, Hood Lagune, New Guinea.

Cyrtus gulliveri, Casteln., redescribed by Ramsay & Douglas-Ogilby, *t. c.* p. 10.

CORYPHÆNIDÆ.

Steinegeria, n. g. (*Bramide*), for *S. rubescens*, n. sp., Jordan & Evermann, P. U. S. Nat. Mus. 1886, p. 467, Gulf of Mexico.

SCOMBRIDÆ.

Thynnus thynnus, L. Notes on the external characters and anatomy of a male specimen captured in the Forth, off Pittenweem; W. C. McIntosh, Ann. N. H. (5) xvii, pp. 326-337, pl. xi. Remarks in reply to some criticisms contained in the above paper; F. Day, *t. c.* pp. 400-402. Additional remarks; W. C. McIntosh, *t. c.* pp. 523-525. Figured by McIntosh, Rep. Fish.-Board. Scotl. 1885, pl. viii.

TRACHINIDÆ.

Trachinus draco, L., and *T. vipera*, C. & V. W. C. McIntosh is inclined to regard the latter form as only a young stage of the former; Ann. N. H. (5) xvii, p. 441. This view is refuted by F. Day, *t. c.* pp. 526 & 527.

BATRACHIDÆ.

RYDER, J. A. The Development of the Toad-Fish (*Batrachus*). Am. Nat. xx, pp. 77-80, and Bull. U. S. Fish Comm. 1886, pp. 4-8, pl. i.

Batrachus cryptocentrus, C. & V. Note on the type specimen; Jordan, P. U. S. Nat. Mus. 1886, p. 546.

PEDICULATI.

Linophryne, n. g. Head enormous; the body slender, compressed, mouth oblique. Spinous dorsal reduced to a single cephalic tentacle, the basal part of which is erect, not procumbent. Teeth in the jaws, on the vomer, and the upper pharyngeals. Gill-openings exceedingly narrow, situated a little below the root of the pectorals. Soft dorsal and anal

very short; ventrals none. Abdominal cavity forming a sac, suspended from the trunk. Skin smooth; a long tentacle on the throat. Collett, P. Z. S. 1886, p. 138. *L. lucifer*, n. sp., *id. t. c.* pl. xv, off Madeira.

Chironectes bifurcatus, McCoy, described and figured by McCoy, Prodr. Zool. Vict. pl. cxxiii.

COTTIDÆ.

Centridermichthys uncinatus, Rhdt. Note by Lütken, Kara-Havets Fiske, p. 10.

Icelus hamatus, Kr. Note by Lütken, *t. c.* p. 9.

Platycephalus arenarius, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. x, p. 577, New South Wales.

Peristedium longispatha, p. 166, and *platycephalum*, p. 167, n. spp., Goode & Bean, Bull. Mus. C. Z. xii, Caribbean Sea.

Lepidotrigla pleuracanthica, n. sp., Ramsay & Douglas-Ogilby, *t. c.* p. 578, Port Jackson.

Prionotus, Lacép. A review of the species, by D. S. Jordan & E. G. Hughes, P. U. S. Nat. Mus. 1886, pp. 327-338. *P. punctatus*, C. & V.: note on the type specimen; Jordan, *t. c.* p. 544. *P. rubio*, n. n. for *P. punctatus*, C. & V., *nec* Bloch; *id. t. c.* p. 50. *P. roseus*, n. sp., Jordan & Evermann, *t. c.* p. 470, Gulf of Mexico.

CATAPHRACTI.

Aspidophoroides olrikii, Ltk., described and figured by Lütken, Kara-Havets Fiske, p. 6, pl. xv, figs. 1-3.

DISCOBOLI.

Cyclopterus lumpus, L. Note on its paternal instincts; McIntosh, Ann. N. H. (5) xviii, pp. 81-84.

Liparis. Lütken, Kara-Havets Fiske, pp. 25-31, has remarks on the Arctic species. *L. fabricii*, Kr., described and figured; *id. t. c.* p. 32, pl. xv, figs. 4 & 5: and note on *L. (Careproctus) reinhardti*, Kr., p. 38.

GOBIIDÆ.

JORDAN, D. S., & EIGENMANN, C. H. A Review of the *Gobiidæ* of North America. P. U. S. Nat. Mus. 1886, pp. 477-518.

Gobius banana, C. & V., *martinicus*, C. & V., *flavus*, C. & V., and *brasiliensis*, C. & V.: notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, pp. 543 & 544. *G. shufeldti*, n. sp., Jordan & Eigenmann, P. U. S. Nat. Mus. 1886, p. 495, Gulf Coast of United States. *G. depressus*, p. 4, Port Jackson, and *concaivifrons*, p. 12, Strickland River, n. spp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i.

Eleotris sima, C. & V., and *grandisquama*, C. & V.: notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, p. 544.

Callionymus lyra, L. On the ova; McIntosh, Rep. Brit. Ass. 1885, p. 1073.

BLENNIIDÆ.

Blennius pantherinus, C. & V. Note on the type specimen; Jordan, P. U. S. Nat. Mus. 1886, p. 544.

Scartella, n. g., having the free gill membranes of *Blennius* and the even teeth of *Isesthes*; for *S. microstoma*, Poey; *id. t. c.* p. 50.

Olinus johnstoni, n. sp., Saville-Kent, Rep. Fish. Tasm. 1886, p. 13, Tasmania.

Acanthoclinus, n. g. Body elongate, compressed, covered with cycloid scales; mouth rather broadly cleft, each jaw with an outer series of conical teeth with smaller ones behind; palate toothed. Dorsal very long, simple, entirely spinose; anal with two spinose rays; ventrals jugular, few-rayed; cephalic tentacles; gill-opening very broad; branchiostegals, six; lateral line interrupted. Mocquard, Bull. Soc. Philom. (7) x, p. 18. *A. chaperi*, sp. n., *id. t. c.* p. 19, Bay of Guanta, Venezuela.

Lumpenus lampetriformis, Walb. On its occurrence on the north coast of Scotland; notes on its habits, food, and the ground it frequents; G. Sim, J. Linn. Soc. xx, p. 38. *L. medius*, Rhdt.: note by Lütken, Karahavets Fiske, p. 12.

SPHYRÆNIDÆ.

Lanioperca mordax, Gthr., described and figured by McCoy, Prodr. Zool. Vict. pl. cxv.

Erisichte, Cope, and *Protosphyraena*, Leidy: which name has priority? Davies, Geol. Mag. (3) iii, p. 141; Cope, *t. c.* p. 239.

ATHERINIDÆ.

Atherina martinica, C. & V., and *boscii*, C. & V. Notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, p. 530.

MUGILIDÆ.

Mugil braziliensis, Ag., = *M. liza*, C. & V.; Jordan, P. U. S. Nat. Mus. 1886, p. 530.

GASTROSTEIDÆ.

A review of the American species, by C. H. Eigenmann, P. Ac. Philad. 1886, pp. 233-252.

Gastrosteus spinachia, L. On its nest and development; Prince, Rep. Brit. Ass. 1885, p. 1093.

MÜBIUS, K. Ueber die Eigenschaften und den Ursprung der Schleimfäden des Seestichlingsnest. Arch. mikr. Anat. xxv, pp. 554-563, pl. xxii; and Biol. Centralbl. v, pp. 647 & 648.

The kidney of the male fifteen-spined Stickleback acts as a spinneret.

LABYRINTHICI.

ZOGRAFF, N. Ueber den sogenannten Labyrinthapparat der Labyrinthfische (*Labyrinthici*). Biol. Centralbl. v, pp. 679-686.

Ctenopoma maculata, p. 159, and *multifasciata*, p. 160, n. spp., Thominot, Bull. Soc. Philom. (7) x, River San Benito, W. Africa.

TRACHYPTERIDÆ.

Trachypterus tania, Bl. Schn., described and figured by McCoy, Prodr. Zool. Vict. pl. cxxii.

Regalecus glesne, Asc.: note on a specimen obtained near Bergen; J. A. Grieg, N. Mag. Naturv. xxx, p. 232. *R. argenteus*, Park.: full account of the skeleton; T. J. Parker, Tr. Z. S. xiii, pp. 5-33, pls. ii-vi.

ACANTHOPTERYGII PHARYNGOGNATHI.

LABRIDÆ.

JORDAN, D. S., & HUGHES, E. G. A Review of the Genera and Species of *Julidinae* found in American Waters. P. U. S. Nat. Mus. 1886, pp. 56-70.

Julis detorsor, C. & V., *psittaculus*, C. & V., *crotophus*, C. & V., and *garnoti*, C. & V. Notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, pp. 540 & 541.

Xyrichthys martinicensis, C. & V., *vitta*, C. & V., and *uniocellatus*, C. & V. Notes on the type specimens; Jordan, t. c. p. 541.

Coris variegata, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 131, New Hebrides. *C. rex*, n. sp., *id. ibid.* x, p. 851, New South Wales.

Corica papuensis, n. sp., Ramsay & Douglas-Ogilby, t. c. p. 19, Strickland River, New Guinea.

Scarus frondosus, C. & V., *quadriscopiosus*, C. & V., *tæniopterus*, Desm. *caelestinus*, C. & V., and *turchesius*, C. & V.: notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, pp. 542 & 543. *S. evermanni*, p. 469, and *bollmanni*, p. 470, n. spp., Jordan & Evermann, P. U. S. Nat. Mus. 1886, Gulf of Mexico.

Callyodon ustus, C. & V., and *auropunctatus*, C. & V. Notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, pp. 541 & 542.

Otenodax, n. g., p. 718, for *C. wilkinsonii*, n. sp., Macleay, P. Linn. Soc. N. S. W. x, p. 719, pl. xlvii, Lord Howe Island. *Otenodax* = *Tetragonurus*, *id. op. cit.* (2) i, p. 511.

ANACANTHINI.

LYCODIDÆ.

Lycodes luetkenii, Coll., p. 14, pl. xvi, *pallidus*, Coll., p. 20, pl. xvii, figs. 1-3, and *reticulatus*, Rhdt. P. jun., p. 22, pl. xvii, figs. 4-6, described and figured by Lütken, Kara-Havets Fiske.

Gymnelis viridis, Fabr. Note by Lütken, t. c. p. 11.

GADIDÆ.

BROOK, G. Preliminary Account of the Food of the Haddock. Rep. Fish.-Board Scotl. 1885, pp. 128-134.

— . Preliminary Report on the Food of the Cod. *T. c.* pp. 134-147.

RYDER, J. A. Success in Hatching the Eggs of the Cod. *Science*, vii. pp. 26-28.

Gadus morrhua, L. : note on the very young Cod ; McIntosh, Ann. N. H. (5) xviii, pp. 307-311 : on vegetable parasites ; Farlow, Bull. U. S. Fish Comm. 1886, pp. 1-4. *G. minutus*, L., is regarded as the young of *G. luscus*, L., by W. C. McIntosh, Ann. N. H. (5) xvii, p. 442 ; remarks by Day, *t. c.* p. 527. *G. säida*, Lep. ; note by Lütken, Kara-Havets Fiske, p. 13.

Merluccius bilinearis, Mitch. Habits ; W. Nye, Bull. U. S. Fish Comm. 1886, p. 208.

OPHIDIIDÆ.

Aphyonius mollis, n. sp., Goode & Bean, Bull. Mus. C. Z. xii, p. 163, Caribbean Sea.

Bregmaceros atlanticus, n. sp., Goode & Bean, *t. c.* p. 165, off Granada and Nevis.

Neobythites robustus, p. 161, off Cuba, and *marginatus*, p. 162, off Barbadoes, n. spp., Goode & Bean, *t. c.*

Barathronus, n. g. Head stout ; body and tail compressed, covered closely by skin, scaleless ; vent far behind pectoral, included in a cleft ; mouth wide, oblique, the lower jaw projecting ; intermaxillary teeth rudimentary ; several fang-like teeth on the head of the vomer, none on palatines ; a few rather large, recurved, separated teeth in the mandible ; nostrils close together and small ; eye visible through the skin, partly upon the top of the head, with or without dark pigment in the iris ; barbel none ; gill-rakers very numerous and slender, and rather long ; gill-laminæ well developed on all the arches ; no pseudobranchiæ ; head full of muciferous channels ; gill-membranes not united, but covered by a fold of skin ; ventrals reduced to single simple rays, placed in advance of the pectorals, and close to the humeral symphysis ; dorsal and anal placed far back ; caudal scarcely differentiated, composed of rather numerous very slender rays upon a somewhat narrow base. Goode & Bean, *t. c.* p. 164. *B. bicolor*, n. sp., *iid. t. c.*, off Guadeloupe.

Pteridium armatum, n. sp., Doderlein, Giorn. Sci. Palerm. xvii, p. 155, pl. i ; Nat. Sicil. v, pp. 73-80 & 105-108, pl. i, Messina.

Xiphogadus, Swains. (*Xiphasia*). Note on specimens from Port Jackson ; Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 582.

Fierasfer. On a specimen imbedded in a Pearl-Oyster ; Günther, P. Z. S. 1886, p. 319, fig.

MACRURIDÆ.

Bathygadus, Gthr. : genus characterized ; Goode & Bean, Bull. Mus. C. Z. xii, p. 158. *B. arcuatus*, p. 158, and *favosus*, p. 160, n. spp., *iid. t. c.* off Martinique.

PLEURONECTIDÆ.

STEINER, J. Functioneller Beweis für die Richtigkeit der Morphologischen Ansicht von der Entstehung des asymmetrischen Baues der Pleuronectiden (Flachfische). Verh. Ver. Heidelb. 1886, pp. 127-137, figs., and Festschrift Naturh. Ver. Heidelberg, 1886, Theil A, pp. 125-127.

RITZEMA Bos, J. Einige Bemerkungen über Pleuronectiden. Biol. Centralbl. iv, pp. 270-273.

On transformations undergone after leaving the egg.

PFEFFER, G. Ueber die Schiefheit der Pleuronectiden. Abh. Ges. Hamb. ix, Heft 1, 8 pp.

An abstract of a forthcoming memoir.

Rhomboidichthys mancus, Brouss. On sexual dimorphism; Facciola, Nat. Sicil. v, pp. 213-220 & 231-235. On the young; *id.* vi, pp. 39-43.

Citharichthys dinoceros, n. sp., Goode & Bean, Bull. Mus. C. Z. xii, p. 157, Caribbean Sea. *C. aethalion*, n. sp., Jordan, P. U. S. Nat. Mus. 1886, p. 52, Cuba.

Solea textilis, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 6, Gulf of St. Vincent, S. Australia.

Zeugopterus unimaculatus, Risso, figured by Brook, Rep. Fish.-Board Scotl. 1885, pl. ix.

Monolene atrimana, n. sp., Goode & Bean, Bull. Mus. C. Z. xii, p. 155, off Barbadoes.

Aphorista marginata, p. 153, off St. Vincent, and *pigra*, p. 154, off Florida, n. spp., Goode & Bean, *t. c.*

PHYSOSTOMI.

SILURIDÆ.

WRIGHT, R. R. On the Skull and Auditory Organ of the Siluroid *Hypophthalmus*. Tr. Soc. Canada, iii, Sect. iv, pp. 107-118.

FRITSCH, G. Uebersicht der Ergebnisse einer anatomischen Untersuchung über den Zitterwels (*Malapterurus electricus*). SB. Ak. Berlin, 1886, pp. 1137-1140.

—. Die äussere Haut und die Seitenorgane des Zitterwelzes (*Malapterurus electricus*). SB. Ak. Berlin, 1886, pp. 415-436.

Clarias falconeri, n. sp. (foss.), Lydekker, Pal. Ind. (10) iii, p. 247, pl. xxxvii, fig. 1, Siwalik Hills.

Heterobranchus paleindicus, n. sp. (foss.), Lydekker, *t. c.* p. 248, pl. xxxvi, fig. 4, Siwalik Hills.

Chrysichthys (?) *theobaldi*, n. sp. (foss.), Lydekker, *t. c.* p. 249, pl. xxxvii, fig. 4, Siwaliks of the Punjab.

Macrones aor, Ham. Buch. On a fossil skull from the Siwalik Hills; Lydekker, *t. c.* p. 250, pl. xxxvi, fig. 5.

Rita grandiscutata, n. sp. (foss.), Lydekker, *t. c.* p. 251, pl. xxxvii, fig. 3, Siwaliks of the Punjab.

Noturus nocturnus, n. sp., Jordan & Gilbert, P. U. S. Nat. Mus. 1886, p. 6, Arkansas.

Pimelodus guirali, n. sp., Thomiot, Bull. Soc. Philom. (7) x, p. 162, River San Benito, W. Africa.

Arius froggatti, p. 14, and *spatula*, p. 15, n. spp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, Strickland River, New Guinea.

Hemipimelodus dayi, p. 16, and *crassilabris*, p. 18, n. spp., Ramsay & Douglas-Ogilby, *t. c.*, Strickland River, New Guinea.

Bagarius yarelli, Sykes. On a fossil skull from the Siwaliks of Nahan; Lydekker, *t. c.* p. 254, pl. xxxvi, fig. 1.

Callichthys littoralis, Hanc. On the nesting; J. A. M. Vipan, P. Z. S. 1886, p. 330.

On a Siluroid spine from the Pliocene of near Perpignan; Sauvage, in Depéret, Description géologique du Bassin Tertiaire du Roussillon (Paris: 1885, 8vo), p. 223, pl. iv, fig. 7.

SCOPELIDÆ.

Saurus synodus, C. & V. Note on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, p. 525.

Benthosaurus, n. g., closely allied to *Bathysaurus* and *Bathypterois*, resembling the latter in nearly every particular save in the structure of the pectoral fins, which are normal. *B. grallator*, n. sp., Goode & Bean, Bull. Mus. C. Z. xii, p. 168, Gulf of Mexico and N. Atlantic.

Scopelus muelleri. Note on a specimen captured off Greenland; Day, Nature, xxxix, p. 571.

CYPRINIDÆ.

EMERY, C., & SIMONI, L. Recherches sur la ceinture scapulaire des Cyprinoides. Arch. Ital. Biol. vii, pp. 390-394.

Carassius vulgaris, n. var. *oblongus*, Warpachowski, Zapiski Ak. Nauk St. Petersb. lii, p. 54, Gov. Kasan, Russia.

Barbus guirali, n. sp., Thomiot, Bull. Soc. Philom. (7) x, p. 163, River San Benito, W. Africa.

Puntius tholonianus, n. sp., *id. t. c.* p. 164, River San Benito, W. Africa.

Leuciscus delineatus, Sieb.: on its occurrence at Antwerp; E. Gens, Bull. Ac. Belg. (3) ii, p. 150. *L. lucidus* n. var. *ilmenensis*, Warpachowski, Zapiski Ak. Nauk St. Petersb. liii, p. 63, fig., Lake Ilmen.

Phoxinus stagnalis, n. sp., Warpachowski, Zool. Anz. ix, p. 76, Gov. Kasan, Russia; figured in Zapiski Ak. Nauk St. Petersb. lii, p. 53.

Hybopsis aestivalis n. var. *marconis*, Jordan & Gilbert, P. U. S. Nat. Mus. 1886, p. 22, Rio San Marcos, Texas.

Notropsis sabineæ, n. sp., *id. t. c.* p. 15, Sabine River, Texas.

CHARACINIDÆ.

SAGEMEHL, M. Die accessorischen Branchialorgane von *Citharinus*. Morph. JB. xii, pp. 307-323, pl. xviii.

Brachyalestes mocquardianus, n. sp., Thominot, Bull. Soc. Philom. (7) x, p. 167, River San Benito, W. Africa.

CYPRINODONTIDÆ.

Fundulus fonticola, C. & V., and *cingulatus*, C. & V. Notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, pp. 526 & 527.

Zygonectes cingulatus, C. & V., described by Bollman, P. U. S. Nat. Mus. 1886, p. 463. *Z. escambia*, n. sp., *id. t. c.*, Escambia River, N. America.

On an undetermined fossil Cyprinodontoid from the Siwaliks; Lydekker, Pal. Ind. (10) iii, p. 256, fig.

SCOMBRESOCIDÆ.

JORDAN, D. S., & FORDICE, M. W. A Review of the American Species of *Belonidæ*. P. U. S. Nat. Mus. 1886, pp. 339-361.

Belone caribbæa, C. & V., *timucu*, C. & V., and *scolopacina*, C. & V. Notes on the type specimens; Jordan, P. U. S. Nat. Mus. 1886, pp. 530 & 531.

Hemirhamphus browni, C. & V.: note on the type specimen; *id. t. c.* p. 529. *H. mocquardianus*, p. 165, Camboja, and *capensis*, p. 166, Cape of Good Hope, n. spp., Thominot, Bull. Soc. Philom. (7) x.

Exocæstus melanurus, C. & V., *volitans*, C. & V., *nec L.* (= *melanurus*), *gibbifrons*, C. & V., *cyanopterus*, C. & V. Notes on the type specimens; Jordan, *t. c.* pp. 527 & 528.

GALAXIIDÆ.

Galaxias kayi, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 6, Fifth Creek, S. Australia.

SALMONIDÆ.

SMITT, F. A. Kritisk Förteckning öfver de i Riksmuseum befintliga Salmonider. Sv. Ak. Handl. xxi, No. 8, 290 pp., 13 tabulæ metricæ, 6 pls.

In addition to a lengthy discussion of the characters of the numerous specimens examined by the author, synoptic keys, in Latin, are given of the species and principal races of *Salmo*, p. 160, and *Coregonus*, p. 285.

CUNNINGHAM, J. T. *Salmonidæ*. Encyclopædia Britannica, 9th ed., xx, pp. 221-227.

BENECKE, B. Beobachtungen über den Aufsteig des Lachses in den Flüssen. Circ. deutsch. Fisch. Ver. 1886.* (Translated in Bull. U. S. Fish Comm. 1886, pp. 119-122.)

DAY, F. Migration of the *Salmonidæ*. I. Notes on "early" and "late" Salmon rivers; Naturalist, 1886, pp. 19-29. II. Periods of Migration; *t. c.* pp. 115-128.

[DAY, F.] On the Hybridisation of *Salmonidæ* at Howietoun. Rep. Brit. Ass. 1885, pp. 1059-1063.

On abnormal embryos of Trout and Salmon; Garman & Denton, Science Observer, v, pp. 1-7, figs.

EBNER, V. v. Ueber die Schleimabsonderung an der Oberhaut der Forellenembryonen. Anz. Ak. Wien, xxiii, pp. 57 & 58.

BARFURTH, D. Biologische Untersuchungen über die Bachforelle. Arch. mikr. Anat. xxvii, pp. 128-179, pls. vii & viii.

On sterility in the River Trout. The sterility is only a temporary one, but can extend over two spawning seasons. Only such Trout as live under natural circumstances are apt to reproduction; such as are enclosed in ponds are sterile.

On the embryology of *Salmo fario*; A. E. Golubeff, Tr. St. Petersburg Nat. Soc. xvi, pp. 74-78. On a malformed head; v. Krauss, JH. Ver. Württ. xlii, p. 345.

Cope, Am. Nat. xx, p. 735, records the occurrence of a species of *Salmo*, perhaps *S. purpuratus*, in streams of the Sierra Madre, Mexico, at an elevation of between 7000 and 8000 feet, in the southern part of the State of Chihuahua, a locality far south of any which has hitherto yielded *Salmonidæ*.

CUNNINGHAM, J. T. On the Mode of Attachment of the Ovum of *Osmerus eperlanus*. P. Z. S. 1886, pp. 292-295, pl. xxx.

HYODONTIDÆ.

Chiromystus, n. g. Dorsal fin small, above the anal, which is moderate. Pectoral with several superior rays thickened and robust. Caudal fin furcate. Ventrals small. No ventral or dorsal scuta. Scales much attenuated. No basilar interneural or hamals. Perhaps belongs to the *Chirocentridæ*. *C. mawsoni*, n. sp. (foss.), Cope, P. Am. Phil. Soc. xxiii, p. 4, near Bahia.

CLUPEIDÆ.

Clupea. J. C. Ewart having examined numerous samples of the White-bait sent to the London market from the middle of January to the middle of August, 1885, has convinced himself that the nature of White-bait varies considerably; sometimes it consists almost entirely of Sprats, while at other times it consists almost entirely of Herring: P. Phys. Soc. Edinb. 1885-86, pp. 78-81; also Ewart & Matthews, Rep. Fish.-Board Scotl. 1885, pp. 98-100.—*C. harengus*: on the hatching of Herring ova in deep water; Ewart, P. Phys. Soc. Edinb. 1885-86, pp. 47-54. Are Herring ova likely to develop normally on the deep off-shore fishing banks? *id.* Rep. Fish.-Board Scotl. 1885, pp. 43-46. On the development of the Herring (pt. ii); G. Brook, Rep. Fish.-Board Scotl. 1885, pp. 31-43, pls. i & ii. Report on the Herring fishery of Loch Fyne and the adjacent districts during 1885; *id. t. c.* pp. 47-61. Report on the food of the Herring; Brook & Calderwood, *t. c.* pp. 102-128. Report as

to variety among the Herrings of the Scottish coasts ; J. D. Matthews, *t. c.* pp. 61-98.—*C. pilchardus* : on the food of the Sardine on the Boulogne coast (chiefly *Hydrozoa*) ; Sauvage, Bull. Soc. Z. Fr. xi, p. 621.—On the possible identity of *C. alosa* and *C. finta* ; Horst, Tijdschr. Nederl. Dierk. Ver. (2) i, p. xlix.

Engraulis argyrophanus, C. & V. Note on the type specimens ; Jordan, P. U. S. Nat. Mus. 1886, p. 525. *E. scratchleyi*, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 18, Strickland River, New Guinea.

Enchodus subæquilateralis, n. sp. (foss.), Cope, P. Am. Phil. Soc. xxiii, p. 3, Brazil.

Diplomystus longicostatus, n. sp. (foss.), *id. ibid.*, near Bahia.

GYMNOTIDÆ.

CLELAND, J. On the Viscera of *Gymnotus electricus*. Rep. Brit. Ass. 1885, pp. 1068 & 1069.

On the reproduction of *Gymnotus electricus* ; E. du Bois Reymond, Arch. Anat. Phys. 1882, pp. 76-80.

MURENIDÆ.

FICALBI, E. Sulla conformazione dello scheletro cefalico dei Pesci Murenoidi italiani. Atti Soc. Tosc. viii, pp. 101-158, pl. xi.

HERMES, O. The Migrations of Eels. [Translated from the German by H. Jacobson.] Rep. U. S. Fish Comm. xii, pp. 1123-1126.

A translation of P. Pavesi's observations on male Eels ; Bull. U. S. Fish Comm. 1886, pp. 222-224.

Anguilla eurystoma, H. & K. Notes by M. Katuriç, Boll. Soc. Adr. ix, p. 219.

Callechelys murana, n. sp., Jordan & Evermann, P. U. S. Nat. Mus. 1886, p. 466, Gulf of Mexico.

On the transformation of a *Leptocephalus* into a Conger ; Delage, C.R. ciii, p. 698.

LOPHOBRANCHII.

SCHÄFF, E. Untersuchungen über das Integument der Lophobranchier: Inaugural Dissertation. Kiel : 1886, 8vo, 36 pp., 1 pl.

Syngnathus parviceps, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 475, Clarence River.

Nannocampus ruber, n. sp., *id. op. cit.* x, p. 757, Port Jackson.

PLECTOGNATHI.

JORDAN, D. S., & EDWARDS, C. L. A Review of the American Species of *Tetraodontide*. P. U. S. Nat. Mus. 1886, pp. 230-247.

VIGNAL, —. Sur les lobes accessoires de la moelle du Mole (*Orthogoriscus mola*). CR. Soc. Biol. (8) iii, pp. 144–146, figs.

Monacanthus browni, Rich., pl. cxxiv, and *hipprocrepis*, Q. & G., pl. cxxv, described and figured by McCoy, Prodr. Zool. Vict. *M. mosaicus*, n. sp., Ramsay & Douglas-Ogilby, P. Linn. Soc. N. S. W. (2) i, p. 5, Port Jackson.

Diodon foley, n. sp. (foss.), Lydekker, Pal. Ind. (10) iii. p. 257, pl. xxxv, fig. 10, Eocene of Ramri I., Arakan coast.

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CYCLOSTOMATA.

RANSOM, W. B., & THOMPSON, D'ARCY W. On the Spinal and Visceral Nerves of *Cyclostomata*. Zool. Anz. ix, pp. 421–426.

SHIPLEY, A. E. On the Development of the Nervous System in *Petro-myzon fluviatilis*. P. Cambr. Phil. Soc. v, p. 374.

—. On the Formation of the Mesoblast, and the Persistence of the Blastopore in the Lamprey. [Abstract.] P. R. Soc. xxxix, pp. 244–248.

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CUNNINGHAM, J. T. On the Structure and Development of the Reproductive Elements in *Myxine glutinosa*, L. Q. J. Micr. Sci. xlii, pp. 49–76, pls. vi & vii.

CLELAND, —. On the Structure of the Tail in *Myxine* (Glutinous Hag). Rep. Fish.-Board Scotl. 1885, p. 211 ; and Rep. Brit. Ass. 1885, p. 1069.

“DIPLORRHINA.”

This division is established for a new (fossil) type, *Mycterops ordinatus*, n. g. & sp., from the Coal Measures of Pennsylvania. The *Mycteropidae* are regarded as occupying a position between the *Antiarcha* (*Tunicata*) and *Marsipobranchii* on the one hand, and the Fishes on the other ; and as descendants of the *Pterichthyidae*, and ancestors of the *Placoganoidei*. Am. Nat. xx, pp. 1027–1031.

INCERTÆ SEDIS.

Edestus davisii, n. sp., for a remarkable Ichthyodorulite from the Carboniferous series, Gascoyne, W. Australia ; H. Woodward, Geol. Mag. (3) iii, p. 1, pl. i. Remarks by Trautschold, Bull. Mosc. 1885, pp. 94–99.

TUNICATA.

BY

PROF. W. A. HERDMAN, D.Sc., F.L.S.

LIST OF PUBLICATIONS.

1. BROOKS, W. K. The Anatomy and Development of the *Salpa* Chain. Stud. Biol. Lab. J. Hopkins Univ. iii, (8) pp. 451-475, pls. xxviii & xxix.
2. DRASCHE, R. VON. Tunicaten von Jan Mayen, in Öster. Polarstat. Jan Mayen Beob.-Ergebn. 3 Bd. Zool. pp. 101-104, pl. viii.
3. GIARD, A. Sur deux Synascidies nouvelles, pour les côtes de France. C.R. ciii, pp. 755-757.
4. HERDMAN, W. A. Report on the *Tunicata* collected during the voyage of H.M.S. 'Challenger,' during the years 1873-76. Part II. *Ascidiee compositae*. Zool. Chal. Exp. vol. xiv, pt. xxxviii, 1886, pp. 432, pls. xlix, 1 map.
5. ——. Report on the *Tunicata* of the L. M. B. C. district, in the Liverpool Marine Biology Committee's 'First Report upon the Fauna of Liverpool Bay, &c.,' pp. 281-311, pls. v & vi.
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7. ——. On the Phylogeny of the *Tunicata* (Abstract). P. R. Soc. Edinb. 1885-86, pp. 444 & 445.
8. ——. On some points in the Phylogeny of the *Tunicata*. Nature, v, 33, No. 858, pp. 546 & 547.
9. LAHILLE, F. Sur une nouvelle espèce de Diplosomien. C.R. cii, No. 8, pp. 446-448.
10. ——. Sur la classification des Tuniciers. T. c. pp. 1573-1575; also Compte-rendu sommaire, Soc. d'hist. nat. de Toulouse, 16 June, 1886.
11. ——. Sur la tribu des Polycliniens. Op. cit. ciii, pp. 485-487.
12. ——. Système musculaire du *Glossophorum sabulosum*. Bull. Soc. Toulouse, 1886.

13. MAURICE, C. Notes sur l'*Amarœcium torquatum*. Arch. Z. expér. 2^e sér. iv, pp. xxvi-xxxii.
14. —. Sur l'appareil branchial, les systèmes nerveux et musculaire de l'*Amarœcium torquatum*. C.R. ciii, pp. 434-436.
15. —. Sur la cœur, le tube digestif et les organes genitaux de l'*Amarœcium torquatum*. T. c. pp. 504-506.
16. NANSEN, F. Foreløbig Meddelelse om Undersøgelser over Centralnervesystemets histologiske Bygninghos Ascidierne samt hos *Myxine glutinosa*. Bergens Mus. Aarsber. f. 1885, pp. 55-78.
17. ROULE, L. Sur quelques variations individuelles de structure des Organes chez les Ascidies simples. C.R. cii. pp. 831-833.
18. —. Sur quelques particularités histologiques du tube digestif des Ascidies simples, &c. *Op. cit.* No. 25, pp. 1503-1506.
19. —. Revision des espèces de Phallusiadées des côtes de Provence. Rec. Z. Suisse, iii, No. 2, pp. 209-259, pls. xii-xv.
20. —. Recherches sur les Ascidies simples des côtes de Provence. Ann. Sci. Nat. (6) Zool. xx. pp. 1-229, pls. i-xiii.
21. SWEDERUS, M. B. Tunikater från Sibriens Ishaf och Berings Haf, &c. Vega. Exped. Vetensk. Jakttag. 4 Bd. pp. 87-112.

ANATOMY.

HERDMAN (4), as an introduction to the description of the new 'Challenger' species, gives a general account, illustrated by diagrams, of the anatomy and histology of the Compound Ascidians. A more detailed account of the structure of certain special forms (particularly the genus *Colella*) is given in the body of the report. One of the most remarkable forms is the deep-sea species, *Pharyngodictyon mirabile*, in which the branchial sac is in the same degenerate condition as in *Culeolus*, amongst Simple Ascidians. It has large meshes, with no true stigmata, and apparently no cilia. A number of species were found to have their ascidiozooids protogynous (*i.e.*, female when young, and male only when full grown).

ROULE (17) finds as an individual variation in *Cynthia papillosa*, L., and *Ascidia elongata*, Roule, the same condition of the duct from the subneural gland as is found normally in *Ascidia mammillata*, Cuv., and *Ascidia marioni*, Roule, viz., the presence of more than one external aperture.

The walls of the alimentary canal in the *Cynthiidae* contain, according to Roule (18), a closed system of delicate tubes, the larger branches of which anastomose, while the finer twigs terminate in ovoid ampullæ. They are grouped mainly around the blood lacunæ; they do not communicate either with the exterior or with the lumen of the alimentary canal, and they enclose granules which give the murexide reaction. Roule considers that they are renal in function, and correspond to the closed renal vesicles of the *Ascididae*.

In continuation of his researches on the Simple Ascidians of the coast of

Provence, ROULE (20) gives now an account of the family *Cynthiidae*. He discusses the position of this family, and gives a detailed account of the structure of the body of a typical *Cynthia*. In the classification he follows Herdman, in dividing the family into 3 subfamilies—the *Styelinae*, the *Cynthinae*, and the *Bolleninae*, of which the two first only are represented in the Mediterranean.

The paper ends with a short account of the family *Molgulidae*, and the species *Eugriopsis lacazei*.

Altogether the Simple Ascidians of the coast of Provence, as made known by the various papers of M. Roule, include 28 species, referred to 13 genera or subgenera belonging to 3 families—*Phallusiadae* (or *Ascididiadae*), *Cynthiidae*, and *Molgulidae*.

NANSEN (16), after an examination of the histology of the nervous system (especially the ganglion) in *Ascidia* and *Myxine*, comes to the conclusion that in the minute structure of the nerve-fibres and nerve-cells, and in their arrangement and relations, there is a close resemblance between the vertebrata and the invertebrata—*Ascidia* and *Myxine*, agreeing in all essential points with what has been described in the higher vertebrata, and with what Nansen had previously observed in the *Myzostomata*.

HERDMAN (6) discusses individual variations in the *Tunicata*, those organs which it usually affects, and those points which should be attended to in describing new species of Ascidians. Various abnormal conditions in the branchial sac, tentacles, dorsal tubercle, and other organs, and in the pigmentation of the body, are described.

LAHILLE (11) gives a brief account of the structure of the post-abdomen, the alimentary canal, and the branchial sac of the *Polyclinidae*.

ROULE (19) revises some of the *Ascididiadae*, and adds to his previous descriptions of some species. He gives a detailed account of the structure of *Rhopalona* (*Rhopalæa*) *neapolitana*, Phil., which—he agrees with Herdman—should be placed close to *Ecteinascidia*, a genus from which it apparently differs only in not reproducing by gemmation.

LAHILLE (9) gives a short account of the structure of a new species of *Diplosoma* (*D. koehleri*) from Guernsey.

MAURICE (13, 14, 15) gives an account of the structure of *Amarœcium torquatum*. He describes particularly the structure of the post-abdomen, the heart, the branchial sac, the muscles, the nervous system, and the alimentary canal. He finds that the dorsal and ventral cavities of the post-abdomen are anterior prolongations of the pericardium, while the median cavity is connected with the branchial sac, and is the epicardium of Van Beneden and Julin. The subneural gland is continuous posteriorly with the beginning of the dorsal ganglionic nerve cord. An oviduct is present, and its anterior end takes part in the formation of an incubatory pouch.

LAHILLE (12) gives an account of the arrangement, functions, and origin of the muscle-bands in the Compound Ascidian *Glossophorum sabulosum* (= *Polyclinum sabulosum*, Giard).

DEVELOPMENT.

HERDMAN (4) traces the course of development by gemmation in some of the new 'Challenger' Compound Ascidiæ. He finds that in *Sarcobotrylloides*, amongst the *Botryllidæ*, buds are formed in the vascular prolongations, or stolons, from the parent Ascidiozoid into the common test. In the genus *Colella* he found that buds were formed in the peduncle of the colony, and were afterwards carried upwards to the region where they appear as young Ascidiozooids.

BROOKS (1) considers that the process of gemmation in *Salpa* has been misunderstood by all previous investigators. He has recently worked it out in *Salpa cabotti* and another larger species, from Wood's Hole, on the American coast, and finds that the budding is in reality a very simple process, directly comparable with the budding of *Pyrosoma*. The buds are produced from the stolon in a single series, but afterwards, as the result of crowding, become placed in two rows, the ascidiozooids of which have their hæmal surfaces towards the middle line of the stolon and their neural surfaces external; the right sides of all which lie on the left side of the stolon, and the left sides of all the others are towards its base. When first formed on the stolon in a single series, all the neural surfaces are proximal in their origin, and all the hæmal surfaces are distal, while the right halves of all the bodies arise on the right half of the stolon, and the left halves on the left. The middle plane of symmetry in the *Salpa* stolon is identical, like the middle plane of the stolon of *Pyrosoma*, with the middle planes of the bodies of all the Ascidiozooids. The final position of the body of the chain *Salpæ* is the result of two secondary changes: (1) during the development and growth of the chain the constituent *Salpæ* are crowded alternately to the right and to the left; and at the same time, (2) each *Salpa* rotates upon its long axis until its hæmal surface becomes internal and its neural surface external. The stolon arises from the hæmal surface of the solitary *Salpa*, and consists of an outer wall of ectoderm, an inner endodermal tube which opens into the branchial sac of the solitary *Salpa* and arises in the fold between the halves of its endostyle, a nerve tube, an ovary, two cloacal tubes, and two mesodermal tubes which give rise to the muscles. The relation which the solitary *Salpa* bears to the first chain *Salpa* in the series (the last which it produces) is exactly the same as the relation between this one and the next, and therefore, according to Brooks, the egg-embryo, or solitary *Salpa*, is really a member of the chain series, and the only essential difference between it and the other members of the chain is its more rapid growth. The ascidiozooids are not formed by budding from the walls of the stolon, but by the direct conversion of its tissues and cavities into those of the *Salpa*.

GEOGRAPHICAL AND BATHYMETRICAL DISTRIBUTION.

A map is given by HERDMAN (4) showing the distribution of the Simple and Compound Ascidiæ obtained during the 'Challenger' Expedition, and tables are given showing the distribution of the families, genera, and species in the great ocean basins. They show that most of the families and genera have a very wide horizontal range. Compound

Ascidians are apparently much more abundant in the southern than in the northern hemisphere. The bathymetrical range of the 'Challenger' Compound Ascidians is from the shore down to 1600 fath. (*Pharyngodictyon mirabile*); comparatively few species, however, extend into the Abyssal zone, and the *Ascidiae Compositae* must be regarded as mainly a shallow-water group.

In the Report on the Fauna of Liverpool Bay, HERDMAN (5) records 47 species of *Tunicata* from the L. M. B. C. district, of which 2 are new to science and 7 new to the British seas.

GIARD (3) records a *Diazona*, which he considers identical with *D. hebridica*, Forb. & Goods, from the south-east coast of Brittany. He also finds *Distaplia rosea*, Della Valle, and from an examination of it has come to the extraordinary conclusion that it is the fixed representative of the pelagic forms *Doliolum* and *Anchinia*!

ROULE (19) records 14 species of *Ascididiæ* from the coasts of Provence. He gives tables (pp. 257 & 258) showing the geographical distribution of these species, and also their distribution according to depth and the nature of the bottom.

VON DRASCHE (2) records 5 species of Simple Ascidians, 2 of them new to science, from Jan Mayen.

PHYLOGENY.

HERDMAN (7) discusses the probable origin and course of evolution of the various groups of the *Tunicata*. He considers that the *Proto-Tunicata* were derived from the *Proto-Chordata*, and are now represented by the *Larvacea* (*Appendiculariidae*). The *Proto-Thaliacea* and the *Proto-Ascidacea* were two divergent branches from the *Proto-Tunicata*, the former of which broke up into the *Cyclomyaria* (*Doliolidae*) and the *Hemimysaria* (*Salpidae*). The *Proto-Ascidacea* which became fixed and modified are represented now by the *Clavelinidae*, from which the various groups of Simple and Compound Ascidians have been derived. The Compound Ascidians are regarded as a polyphyletic group derived from the ancestral Simple Ascidians at three distinct points. The *Ascidiae Salpiformes* (*Pyrosoma*) are considered as being allied to the Compound Ascidians through *Ceolocormus*, and have no direct connection with the *Thaliacea*.

A more detailed phylogeny of the families of the *Ascidiae Compositae*, showing the positions and genetic relations of the new 'Challenger' forms, is given in (4), at p. 387.

LAHILLE (10) proposes a new classification of the *Tunicata*. He first divides them (following Balfour) into *Perennichordata* (the *Larvacea* of Herdman) and *Caducichordata* (the *Thaliacea* and *Ascidacea* of Herdman), and then subdivides the latter, according to the condition of the branchial sac, into—(1) *Aplousobranchiata* (including *Salpa*, *Doliolum*, and apparently *Pyrosoma* and some families of the Compound Ascidians, such as the *Diplosomidae*, the *Didemnidae*, and the *Polyclinidae*); (2) *Phlebobranchiata* (including *Diazona* and some of the *Clavelinidae*, and the *Ascididiæ*); (3) *Stolidobranchiata* (including the *Cynthiidae*, the *Molgulidae*, and the *Botryllidae*).

SYSTEMATIC.

The classification adopted here is that used in the 'Challenger' reports on the *Tunicata*. There is nothing to record under this head in the *Larvacea* and *Thaliacea*.

ASCIDIACEA.

ASCIDIÆ SIMPLICES.

Fam. I. CLAVELINIDÆ.

A new variety of *Clavelina lepadiformis*, *cinnamomea* n. var., is described by Herdman (5, p. 296), from the Isle of Man.

Fam. II. ASCIDIIDÆ.

Roule (19) divides this family (*Phallusiadées*) into 2 subfamilies: the *Cionidées* and the *Phallusidées*. He revises the species of the coast of Provence, and describes as new:—*Pleurociona*, n. subg., of *Ciona* (p. 239), *P. edwardsi*, n. sp., Roule, (19) p. 240.

Ciona aspera, n. sp., Herdman, (4) p. 416.

Ascidia elongata, n. sp., Roule, (19) p. 251; *A. fallax*, n. sp., Drasche, (2) p. 102.

Fam. III. CYNTHIIDÆ.

Culeolus willemoesi, n. sp., Herdman, (4) p. 403.

Bathyoncus discoideus and *B. minutus*, n. spp., *id. t. c.* pp. 407 & 409.

Polycarpa bassi and *P. aspera*, n. spp., *id. t. c.* pp. 413 & 415; *P. monensis*, n. sp., *op. cit.* (5) p. 305.

Fam. IV. MOLGULIDÆ.

Eugyra symmetra, n. sp., Drasche, (2) p. 103.

Molgula carpenteri, n. sp., Herdman (4) p. 401.

ASCIDIÆ COMPOSITÆ.

The position and the classification of this group are fully discussed by Herdman (4), and 88 new species, 10 new genera, and 2 new families are described. The Compound Ascidiæ are defined as "fixed Ascidiæ, which reproduce by gemmation, so as to form colonies in which the Ascidiozooids are imbedded in a common test" (p. 28).

Fam. I. BOTRYLLIDÆ.

Botrylloides tyreum (= *B. purpureum*, Herd., not v. Drasche), *B. perspicuum* (and *rubicundum* n. var.), *B. nigrum* and *B. fulgurale*, n. spp., Herdman, (4) pp. 41, 45, 50, & 52.

Sarcobotrylloides wyvillii, n. sp., *id. t. c.* p. 57.

Polycyclus lamarchi and *P. jeffreysi*, n. spp., *id. t. c.* pp. 63 & 66.

Fam. II. DISTOMIDÆ.

Colella, n. g., Herdman, (4) p. 72. *C. pedunculata*, *C. thomsoni*, *C. gaimardi*, *C. pulchra*, *C. elongata*, *C. quoyi*, *C. murrayi* (and *rubida* n. var.), *C. ramulosa*, and *C. concreta*, n. spp., *id. t. c.* pp. 74, 94, 103, 106, 110, 113, 115, 120, & 123.

Distaplia valli, n. sp., *id. t. c.* p. 128.

Of doubtful genus: (?) *clava* and (?) *pyriformis*, n. spp., *id. t. c.* pp. 132 & 133.

Cystodytes draschii and *C. philippinensis*, n. spp., *id. t. c.* pp. 137 & 140.

Symplegma, n. g. (possibly belonging to the family *Botryllidæ*), *id. t. c.* p. 144. *S. viride*, n. sp., *id. ibid.*

Fam. III. POLYCLINIDÆ.

Pharyngodictyon, n. g., Herdman, (4) p. 152. *P. mirabile*, n. sp., *id. t. c.* p. 153.

Tylobranchion, n. g., *id. t. c.* p. 157. *T. speciosum*, n. sp., *id. ibid.*

Atopogaster, n. g., *id. t. c.* p. 163. *A. gigantea*, *A. aurantiaca*, *A. informis*, and *A. elongata* (and *pallida* n. var.), n. spp., *id. t. c.* pp. 164, 168, 171, & 173.

Morchellioides, n. g., *id. t. c.* p. 176. *M. affinis*, n. sp., *id. t. c.* p. 177. *M. alderi*, n. sp., *id. t. c.* p. 291.

Morchellium giardi, n. sp., *id. t. c.* p. 181.

Sidnyum pallidum, n. sp., *id. t. c.* p. 184.

Polyclinum pyriforme, *P. fungosum*, *P. depressum*, *P. molle*, *P. incertum*, and *P. minutum*, n. spp., *id. t. c.* pp. 188, 190, 193, 194, 196, & 197.

Aplidium incrustans, *A. fuscum*, *A. leucophæum*, *A. crassum*, *A. despectum*, and *A. fumigatum*, n. spp., *id. t. c.* pp. 201, 203, 205, 207, 210, & 211.

Amaroucium variabile (and *tenerum* n. var.), *A. globosum*, *A. complanatum*, *A. irregulare* (and *concinnum*, n. var.), *A. pallidum*, *A. recumbens*, *A. hepaticum*, *A. levigatum*, *A. colelloides*, *A. albidum*, and *A. nigrum*, n. spp., *id. t. c.* pp. 216, 219, 221, 223, 226, 227, 229, 231, 233, 234, & 236.

Psammaphidium, n. g., *id. t. c.* p. 237. *P. spongiforme*, *P. effrenatum*, *P. rude*, *P. subviride*, *P. exiguum*, *P. ovatum*, *P. retiforme*, *P. flavum*, and *P. pyriforme*, n. spp., *id. t. c.* pp. 239, 241, 242, 244, 245, 246, 248, 249, & 419 (Appendix B).

Of doubtful genus: (?) *ignotus*, n. sp., *id. t. c.* p. 251.

Lahille (11) revises the synonymy of some of the French species of the *Polyclinidæ*, and briefly discusses certain points in their structure, especially the post-abdomen. He divides the family into two families—the *Polyclinidæ* and the *Aplididæ*. Lahille (12) changes the name of *Polyclinum sabulosum*, Giard, to *Glossophorum sabulosum*.

Fam. IV. DIDEMNIDÆ.

Didemnum savignii, *D. aurantiacum*, and *D. (?) inerme*, n. spp., Herdman, (4) pp. 261, 264, & 265.

Leptoclinum tonga, *L. moseleyi*, *L. speciosum* (and *asperum* n. var.), *L. annectens*, *L. tenue* (and *magnizooidium* n. var.), *L. propinquum*, *L. neglectum*, *L. albidum*, *grande* n. var., *L. subflavum*, *L. jeffreysi*, *L. carpenteri*, *L. thomsoni*, *L. edwardsi*, *L. japonicum*, *L. (?) jacksoni*, and *L. rubicundum*, n. spp., *id. t. c.* pp. 269, 272, 274, 280, 281, 284, 286, 291, 293, 295, 296, 298, 300, 302, 303, & 305.

Fam. V. DIPLOSOMIDÆ.

Diplosomoides, n. g., *id. t. c.* p. 309; *D. molle*, n. sp., *id. t. c.* p. 310.

Diplosoma macdonaldi, n. sp., *id. t. c.* p. 315; *D. kähleri*, n. sp., Lahille, (9) p. 446.

Fam. VI. CÆLOCORMIDÆ, n. fam., Herdman, (4) p. 317.

Cælocormus, n. g., Herdman, (4) p. 318; *C. huxleyi*, n. sp., *id. ibid.*

Fam. VII. POLYSTYELIDÆ, n. fam., Herdman, (4) p. 322.

Goodsiria placenta (and *fusca* n. var.), and *G. pedunculata*, n. spp., Herdman, (4) pp. 328 & 335.

Synstyela incrustans, n. sp., *id. t. c.* p. 342.

Chorizocormus, n. g., *id. t. c.* p. 345; *C. reticulatus*, n. sp., *id. t. c.* p. 316.

MOLLUSCA.

. BY

W. E. HOYLE, M.A., F.R.S.E.

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- (3) Sur le système nerveux de quelques Mollusques pulmonés (*Achatina*, *Bulime*, *Helix*, *Nanina*, *Vaginule*). *T. c.* pp. 107-119.
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- (2) Nouvelles rectifications de Nomenclature. *T. c.* p. 261.
- (3) Diagnoses de quelques espèces de *Buliminus* de l'Asie Centrale Russe. *T. c.* p. 270.
- (4) Notes Rectificatives. *T. c.* p. 292.
- (5) Note sur certains Sections du genre *Physa* et diverses formes de ce genre. *T. c.* p. 357.
- (6) Sur l'habitation de deux espèces d'*Helix*. *T. c.* p. 366.
- (7) Essai monographique sur les *Buliminus* de l'Asie centrale, russe, et de l'Afghanistan. Bull. Soc. mal. Fr. iii, pp. 15-64.
- (8) Supplément à l'essai monographique sur les *Buliminus* de l'Asie centrale, russe, et de l'Afghanistan. *T. c.* pp. 329-339.
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† Indicates that though the Recorder has not seen the paper, an abstract has been obtained from some other source, which is usually indicated.

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WARD's catalogue forms a compact systematic handbook.

ANATOMY AND PHYSIOLOGY.

The primitive *Cephalopoda* are held to have resembled *Dentalium*. (1) The arms are not the anterior portion of the foot ; the portion of the sub-œsophageal mass from which they are innervated, though apparently pedal, is really cerebral ; and many nerve fibres supplying the arms pass through the lateral commissures into the cerebral ganglia. The arms are compared with the tentacles of *Nautilus* and the cephalocones of *Clione*. (2) In *Pneumodermata*, though the arms develop at a distance from the head, they are still innervated from the cerebral ganglia, and they are not ctenidia because of their position at the sides of the mouth. (3) A detailed comparison is drawn between the disposition of the various organs in *Dentalium*, *Nautilus*, and *Sepia*. Cephalopods are not regarded as having been derived from Pteropods ; GROBEN (1).

The nervous system is described in detail in many *Pteropoda*. They have an asymmetrical visceral commissure, which recalls that of certain *Gastropoda*, and various stages in its modifications are exhibited by parallel instances in the two groups. The pleural ganglia are paired, not unpaired, as stated by v. Jhering ; the buccal appendages are innervated by the cerebral ganglia, and thus are not homologous with the arms of the *Cephalopoda*. Spengel was correct in regarding the *Pteropoda* as euthyneurous ; PELSENER (5).

Detailed résumé of anatomy of *Pteropoda* ; see BOAS (2), preliminary account, *id.* (1).

The position of the naked Molluscs in the various families of Pulmonates is discussed by FURTADO (2).

Geomacrus resembles *Arion* in most respects, but the penis instead of

being formed from the oviduct is the modified stem of the bladder; possibly also the renal aperture is separated widely from the anus; SIMROTH (6).

Peltella, anatomy of; JHERING (1).

An account of the anatomy of his genus *Govia* is given by TRINCHESE.

The anatomy of *Fissurella* is exhaustively treated by BOUTAN; the points of novelty have been already published in preliminary notices (see Zool. Rec. xxii, *Moll.* pp. 3, 29, 34, & 39), and an abstract of the paper is supplied by the author, from which the following remarks as to the relation of this to other forms are taken: *Fissurella* in its larval condition presents resemblances to *Rimula* and *Emarginula*, and possibly to *Parmophorus*, *Haliotis*, and *Trochus*. *Parmophorus* is an *Emarginula* in which the slit remains as a simple notch, while in *Haliotis* it is closed at intervals. *Fissurella* differs from this last in the presence of four salivary glands, the absence of two superior œsophageal pouches and of a spiral cœcum, and in the position of the anus; also in the absence of the left organ of Bojanus. The nervous systems of *Parmophorus* and *Emarginula* form two terms intermediate between *Haliotis* and *Fissurella*; in the latter the coalescence of the pedal and asymmetric centres is most complete. *Fissurella* in the larval state is a true Gastropod; it has a spiral shell, which directly develops into the straight shell of the adult; the larva is asymmetrical, and the symmetry of the adult is a continual masking of this; the nervous system admits of being referred to the normal type. *Fissurella* and its allies must not be regarded as primitive Gastropods, as by v. Jhering and Spengel.

The anatomy of the *Marseniadæ* in general, and of three new species, is treated by BERGH (1, 2). A detailed account is given of the anatomy of *Chelyonotus semperi*, Bgh., and *C. longanus*, Q. & G., var. *berghi*; BERGH, (5) pp. 193-225.

On the basis of anatomical examination the *Ptenoglossa* are united with the *Tanioglossa*, their relationship being indicated by the genus *Torinia*, from which their radula may be derived by atrophy of the median tooth and multiplication of the lateral teeth. The *Solaridæ* are placed as a highly organised group among the dialyneurous forms; the *Scalaridæ* above them, or near the *Turritellidæ* if they should prove to be zygoneurous; the *Ianthinidæ* above the *Vermetidæ* among the zygoneurous forms; BOUVIER (10).

Xenophora cavaleri has a moderately developed non-protractile proboscis, long tentacles, with sub-basal eyes, and a long curved gill; the genital passage is separated from the rectum, and the genital outlet from the anus; the nervous system is chistoneurous and zygoneurous. *Calyptrea* is also chistoneurous and zygoneurous, but has a cephalic penis; BOUVIER (8).

An examination of the general structure of *Solarium trochleare* and *Ianthina globosa*, and of the nervous system in particular, leads to the result that these genera cannot be placed in close relationship to each other, as was done by Troschel, on account of the dentition; BOUVIER (9).

The examination of *Turbo setosus* has on the whole confirmed Soule-

yet's account of its anatomy. The genus is chiastoneurous; the triangular cerebral ganglia are placed antero-laterally on the pharyngeal sac, and united by a long sub-œsophageal commissure, and give off the thick proboscidian nerves as well as the cerebro-pedal and cerebro-commissural connectives. The pedal and commissural ganglia form a quadrilobate infra-buccal mass, while a branch from the proboscidian nerve passing between the œsophagus and the buccal mass enters the horse-shoe-shaped stomatogastric ganglionic mass. The nervous system of the *Neritide* and *Navicellæ* resembles closely that of *Turbo*; but it is noteworthy that, so far as investigations have yet gone, it does not seem to be chiastoneurous; BOUVIER (6).

Concholepas sp. is externally parasitic on *Linckia multiformis*, from Ceylon: it occurs on the lower surface of the arm, attached by a number of elevations, which penetrate the cutis. The centre of this surface is occupied by the pharynx, which acts as a proboscis, and has a pumping action; there is no radula. "The true foot is a small semi-lunar fold on the hinder surface"; a similar anterior fold being the remnant of the velum. There are salivary glands and one gill; the adult shell is 1 cm. long, and has a general resemblance to *Ancylus*; SARASIN.

Stylina sp. forms conical swellings on the arm of *Linckia multiformis*, the apex of the shell, which is 1 cm. long, and has 8 whorls, projecting from an aperture. There is a false mantle, acting as a respiratory pump, and a muscular proboscis, which may extend 1.5 cm. Pharynx, radula, and operculum are absent; eyes and otocysts present; the sexes are separate; SARASIN.

The body of *Pterotrachea* may be regarded as a tube of muscular and gelatinous material, the latter enclosing numerous large cells with large nuclei; in the post-anal tail the muscles are in four bands, and the large round cells are replaced by stellate ones; the fin consists of two muscular plates. There are four groups of ganglia: (1) three pairs of cerebral; (2) one pair of pharyngeal; (3) one pair of pedal; (4) two unpaired visceral ganglia. The "ciliated organ" consists of a nervous band, derived from the visceral ganglion, with a fibrous centre and peripheral ganglion cells, and an epithelial portion exhibiting a median mass of large stratified cells, with a depression where the nerves enter and a lateral elevation of long ciliated cells. A muscular *cul-de-sac* is formed at the root of the tail, and below it is the pericardium, which is quite distinct from the perienteric cavity. The branchiæ round the ciliated organ are described; the œsophagus is much elongated, and the intestine and liver reduced. An aberrant Heteropod [? allied to *Curinaria*] is described; WARLOMONT.

BERGH (4) expresses the opinion that *Phœnicurus* is merely a papilla of *Tethys*. LACAZE-DUTHIERS (1) replies, stating that Dujardin had pointed out the resemblance of such papillæ to the true *Phœnicurus*, distinguishing between hepatic cæca and the dendrocœlous intestine of *Phœnicurus*, and asking of what use to *Tethys* can be appendages which fall off so easily. SPENGLER complains that Lacaze-Duthiers has neglected the whole previous literature on *Phœnicurus*, and confirms Bergh's view that these organisms are merely papillæ of *Tethys*; see also MÖBIUS (2).

A rudimentary head with four tentacles, and a stomatogastric system have been found in *Meleagrina margaritifera*; the latter consists of a cord passing from the brain and dividing into two branches, of which the anterior ends in a buccal ganglion, while the posterior forms a sort of jugular commissure, as in *Haliotis*. There is also an anal foliaceous operculum; the ventricle of the heart is not traversed by the rectum, and the auricles are situated on its anterior aspect; MAYOUX.

In *Pliodon* the labial palps are semi-lunar in form, and have a long straight attachment; the gills divide the pallial chamber into two quite distinct spaces. The anterior spaces communicate with the exterior by two orifices, so that there are three openings into the mantle-cavity—pedal, branchial, and anal. The pericardial gland is very large; the muscles of the mantle and foot are described in detail; PELSENER, (4) pp. 116–128.

SIMPSON (1) gives an elementary, but full description of the anatomy of *Anodonta fluviatilis*, which is profusely illustrated by well-executed plates.

Lepidomenia, n. g., for *L. hystrix*, n. sp. A unique specimen, 2 mm. long, was found in the Gulf of Marseilles, at a depth of 30 mètres. It resembles *Proneomenia* internally, but has a spicular outer covering. The hypoderm is thick, and contains large brown cells (glandular?); posteriorly it is modified into a sensory pit, like that found in *Proneomenia*. Anteriorly is a pedal groove with glands. Within are muscular bundles, and the general cavity is occupied by a connective tissue. The heart is the only well-differentiated organ; it is situated posteriorly in a large pericardium, which gives off two simple nephridial tubes, surrounded by a cellular excretory mass. These unite below the rectum into a single tube, which fuses with the latter to form a common cloaca, which has no gills, as in *Proneomenia*. The animal was not sexually mature. The digestive tract opens by a pharynx, with large internal tactile papillæ and buccal glands. There is a radula of 8 strong teeth, two of which have 6 teeth each; there are also 8 reserve teeth; near this are the salivary glands. The intestine has a little dorsal cæcum, and then passes on to the rectum; there is a dorsal ciliated tract internally, but the greater part is lined with clavate digestive cells, which disappear towards the rectum. There is a large cerebrum, anterior to the radula, and an oesophageal collar; two large pedal ganglia below and anterior to the radula, united by a commissure, and a posterior ganglion on the pedal trunks; there is no sublingual commissure forming a second oesophageal collar; MARION & KOWALEWSKY.

1. *Shell, Integument, and Connective Tissue.*

Hairs on certain species of *Helix* discussed; JEFFERY.

Albino examples of *Arion bourguignati*; SIMROTH, (2) p. 340.

The interbranchial web and dorsal cartilage of *Cirroteuthis* are described by HOYLE, (1) pp. 58.

Suckers of *Inioteuthis morsei* described; *id. t. c.* p. 114.

1. The phragmocone of the Belemnite grew by introssusception. 2.

The rostrum grew by apposition, and its form was determined by the phragmocone. 3. The pro-ostracum was covered by the anterior portion of the rostrum; this part was not sharply marked off from the rest. 4. Like the rostrum, the phragmocone had a thin calcareous margin, which projected beyond the rostrum, and in the dorsal portion of which the pro-ostracum lay. 5. In the *Sepia* shell all characteristic components of the Belemnite shell are to be found; the siphon alone lacking; RIEFSTAHL.

Researches on myohæmatin and histohæmatins; MACMUNN (2).

3. Digestive System.

Digestive organs of *Buliminus* sp., described by Simroth; BÆTTGER, (11) pp. 17-20.

The radula of 5 genera of *Stylomatophora* is elaborately described and figured by DYBOWSKI, (1); his conclusions are summed up as follows:—

I. The inner lateral plate provided with a median lateral tooth.

a. The outer lateral plates are hook-shaped, very long, and with a cutting edge along their whole length: *Limax*, *Hyalina*.

b. The outer lateral plates are hook-shaped, short, and have a toothed margin: *Vitrina*.

II. The inner lateral plates have no lateral tooth.

a. The outer lateral plates have long pedicles: *Succinea*.

b. The outer lateral plates are lamellar and toothed on the posterior margin: *Helix*, *Arion*.

DYBOWSKI (2) in attempting to answer the question as to the systematic value of the radula, gives some preliminary communications, with an account of his modes of observation and delineation, with special descriptions and detailed measurements in the case of *Amphipeplea* and *Planorbis*.

The oral lobes have been investigated in eighteen families of *Pelecypoda*, and in several forms their anatomy examined. They are covered with a single layer of ciliated epithelium, beneath which there are goblet cells. Cells, apparently sensory, are also found in grooves or on elevations of the epithelium. In *Mytilus*, a large blood-space runs along the upper edge of the oral lobe, which may be regarded as a true vessel homologous with the tentacular artery of the *Naiadæ*. Below the sub-epithelial basement membrane are muscles and nerves, disposed parallel to the long axis of the organ. At the lower margin are a number of cells, probably glandular, though their ducts have not yet been demonstrated; and along the junction of the ridges with the tegumentary fold are structures apparently corresponding with the chitinous rods in the gills. Direct experiments have shown the lobes to have an ingestive function, though the marginal cilia produce a current seemingly intended to drive away the water from which food has already been obtained; perhaps there is also a secondary respiratory function; THIELE.

4. Circulatory System.

The blood-passages of *Pelecypoda*, even the so-called "arteries," are all lacunæ, and the muscle-fibres which surround them are not proper to

them; the whole apparatus and the contained fluid suggest the lymphatics of Vertebrates. The usual condition is one of turgescence, and the mass of blood is sufficient to account for all changes of volume of different organs, without the presence of pores for the entrance of water or exit of blood; ROULE (1).

For experiments on the heart of *Pulmonata*; see RICHARD.

Innervation of the heart of *Helix*; TRAMBUSTI (p. 37, *postea*).

The blood-vessels and pulsations of the heart, at the rate of 50 to the minute, were visible through the skin of the living *Helix thyroides*; SIMPSON (2).

5. Respiratory System.

The gills of *Fasciolaria* develop as a series of folds on the dorsum of the veliger, uncovered by the mantle; they afterwards become plate-like, and come to occupy the usual position, hanging on the inner surface of the mantle in a special cavity. The heart is at first in front of the gill, but as this is carried forward it is left behind. The adult gill has the same structure as in *Fulgur*, but its development is more primitive. The ctenobranch condition is regarded as being more primitive than the ctenidial; OSBORN (1).

DAVIS, in opposition to Spengel, states that the rudimentary gill of *Patella* is covered by a continuation of the olfactory epithelium, and also that it is entirely made up of trabeculæ of connective tissue. It may possibly have a function other than that of smell (? locality-sense).

6. Excretory and Secretory Systems.

The elaborate paper of FRENZEL (1) on the Molluscan mid-gut gland has been to some extent anticipated by preliminary communications [*vide* previous Records]. I. Histology:—(a) granular cells (liver-cells of Barfurth) occur in all groups except Cephalopods; they contain a spherical vesicular ball, enclosing pigment-granules, fat-globules, and masses of albumen. A hair-fringe is present, and is long in *Cephalopoda* and some *Pelecypoda*; a ciliated fringe may have been derived from it. (b) The club-shaped cells occur in all types of Molluscs; they contain a spherical ball, with more or less pigmented contents; fat and albumen are also commonly present. Their secretion is acted on by strong acids, thus differing from that of the granular cells. (c) Calcareous cells occur often but not always; they contain calcium phosphate. II. Physiology:—The gland is said to have a digestive function in all cases, discharged both by the glandular and club-shaped cells. The calcareous cells are not secretory. No true constituents of bile could be demonstrated. So complex an organ probably discharges other functions hitherto unknown.

The so-called "liver" of *Cephalopoda*, and also of some *Prosobranchiata*, contains only one kind of epithelial cell, comparable with the club-shaped ferment-cells of other *Mollusca*; in these forms it must be regarded as digestive. In other *Prosobranchiata* the cells are granular, and according to Barfurth the organ must here be regarded as a true liver. In the *Opisthobranchiata* there are two kinds of cells, and it may be a "hepato-pancreas." So many histological details are common to the

organ in all groups, that the author thinks it must have a common function, which is probably not glycogenous; FRENZEL (2).

The œsophageal glands of *Octopus* resemble bunches of grapes in section, and consist of abundant interstitial tissue, an amorphous matrix, fusiform cells, capillaries, nerve-fibres and sheaths round the ducts; the excretory canals have an opaque striated lining, and the gland is not acinous but a ramified tube. The terminations of the tubes contain very granular polyhedral cells, while higher up are elongated cells; perhaps different states of the ferment-producing cells. The excretory canals are lined by a single layer of opaque balls, each of which is striated and surrounded by a clear zone in which is a nucleus. The gland probably secretes both mucin and ferment; PILLIET.

APATHY confirms the existence of mucous cells in *Unis* (which Kollmann regarded as interstitial spaces); they are disposed in groups, and are connected with an efferent duct; each cell has not its own duct, as was erroneously stated by Carrière.

In the *Pulmonata* the organ of Bojanus presents great structural analogy with the lung; it does not receive arterial blood from the aorta, but a small amount of venous from the general cavity and a much larger quantity of arterial from the lung; this latter is concentrated in a receiver, extending the whole length of the organ above the excretory canal, hence it is distributed in the lacunæ of the walls of the organ, where it mixes with the venous blood of the general cavity. The blood which has circulated thus always returns to the pulmonary vein by one or more canals. It is possible that the organ of Bojanus, in addition to its primary functions, plays an important part in respiration and circulation; AMAUDRUT (2).

MACMUNN (3) describes a method of obtaining uric acid crystals from the nephridium of *Pulmonata*; in *Helix aspersa* the crystals were of various shapes, the size depending on the mode of preparation; similar crystals which exhibited the murexide reaction were got from *Limax flavus*. In the juice of the nephridium of *Helix* there are spherical crystals, regarded by some observers as bile-pigment: they probably consist, however, of urates of calcium and sodium. Their central portion consists of radially-disposed needles.

In the same author's (1) extensive paper on Enterochlorophyll there are some incidental references to the pigments of *Mollusca*. On hæmatoporphyrin in the integument of *Limax*, cf. *id.* (4).

The byssus gland and the attachment of Lamellibranchs to foreign bodies, are described by CATTIE in a considerable number of species; the walls of the byssus-cavity secrete constantly; the lamellæ in the anterior portion fuse to form the trunk of the byssus ("round tendon" of Réaumur). When the orifice of the cavity is less distinct, the lamellæ of the byssogenous material alternate with lacunæ. The epithelium of the byssus cavity is generally ciliated; glandular cells are disposed around it, and an increased surface is sometimes obtained by the plication of the walls. The author does not believe in the inception of water through pores in the foot.

The byssus of *Pelecypoda* is peculiar to the group, and secreted by

glands homologous with the pedal glands of Gastropods; the so-called aquiferous pores are the apertures of these glands, there being no direct communication between the circulatory apparatus and the exterior; BARROIS.

The pericardial gland in *Pelecypoda* is lobate, and consists of cæca, situated anteriorly in the pericardium and developed from its epithelium; its degree of development varies considerably. The epithelial cells contain various concretions. Its function is probably renal, the products escaping into the kidney: probably it is homologous with structures already described in the *Cephalopoda*; GROBBEN (2).

7. Nervous System.

Some observations on the true nervous and connective elements in the central nervous system are described by HALLER, in which certain *Mollusca* are incidentally referred to. The author comes to the conclusion that the central nervous network was originally distributed evenly over the whole surface of the body.

In the nervous system of Gastropods the origin of the cerebro-sympathetic connectives from the anterior superior surface and the presence of two symmetrical ganglia in the angle between the œsophagus and lingual pouch are constant phenomena, and these two ganglia form the stomatogastric centre. Subsidiary ganglia are developed in correlation with specially elaborated portions of the digestive tract, but these are not to be confused with the stomatogastric centre proper; LACAZE-DUTHIERS (2).

The visceral commissure of *Prosobranchiata* is chiastoneurous: it originates in the commissural ganglion, and has a subintestinal branch passing backwards from left to right under the œsophagus and forming the subintestinal ganglion. Another branch crosses above the intestine, forming a supra-intestinal ganglion, and eventually joining the subintestinal branch; BOUVIER (4).

There is no proboscidian commissure in the *Ctenobranchiata*, but there is a connective joining the right commissural ganglion with the subintestinal, and formed by the union of the right pallial nerves, which spring from the right commissural, and the subintestinal ganglia. In the *Cerithiidae* its formation may be traced step by step. In *Ampullaria* the left pallial nerve is converted into a connective; BOUVIER (3).

The nervous system of *Conus* has a general resemblance to that of *Buccinum undatum*, both being chiastoneurous; the cerebral, commissural, and supra-intestinal ganglia are closely approximated, while the pedal and sub-intestinal are at some distance from them on the right side of the body. The points of difference are: long sympathetic connectives, two long sympathetic commissures—the posterior the larger—a visceral commissure, with two branches directed backwards and to the left, and bearing three distinct ganglia. The *Terebridae* have a retractile proboscidian sheath, variations in which led Troschel to divide the group into five genera; a step hardly justified, since they agree in having two salivary glands united in the middle line; a double fold of the œsophagus, as in *Buccinum*, in the angle of which lie the nervous centres; the penis and siphon well-developed—a purple-gland. The disposition of the nerves is characteristic; each cerebral ganglion sends two strong cords into the

proboscis, the outer giving off a slender nerve, at once tentacular and optic. Between these bundles are two formed by the pedal nerves. The right visceral commissure bifurcates almost immediately, and sends a strong branch into the neighbouring tissues; the visceral loop is long and narrow. In *Pleurotoma babylonius* the nervous system resembles that of *Terebra* in all essentials, whilst in *P. nodifera* it is on the same type as that of *Conus virgo*. It appears that the *Toxoglossa* are united by characters mainly negative; they may be arranged in a series leading up from *Buccinum*, and perhaps ending in the *Cancellariidae*, whilst the *Prosobranchiata*, as a whole, have a constancy in the structure of the nervous system, which justifies their erection into an order by Milne-Edwards; within this group may be clearly distinguished two subdivisions—one with two and the other with three nervous collars; BOUVIER (5).

The *Neritidae* and *Helicinidae* present the three characters common to all *Scutibranchiata*:—(1) Four anterior periesophageal nervous collars; (2) the origin of the stomatogastric system in a ganglionic proboscidian process on the cerebral ganglia; (3) the existence of two long, pedal, more or less ganglionic cords, usually connected by transverse anastomoses. They are distinguished, however, by the orthoneurous pallio-visceral system, a character peculiar to these two families among the *Prosobranchiata*. This and other modifications are perhaps correlated with a change from marine to fresh-water and terrestrial life, and may be illustrated in a progressive series in the following forms: *Nerita peloronta*, *Neritina canalis*, *Navicella*, *Helicina brasiliensis*, and *H. sugraiana*; BOUVIER (7).

Ampullaria is both chistoneurous and zygoneurous; the right pallial nerve supplies the penis, which is an appendage of the mantle (apparently a unique arrangement). The epipodium is of pallial origin, being innervated by the commissural ganglia. The gills are homologous with the left gill and osphradium of the *Zeugobranchiata*. The genus should be placed among the zygoneurous *Tanioglossa* near the *Culyptreidae*; BOUVIER (2).

Under *Scutibranchiata* are arranged a number of forms of *Cyclobranchiata* and *Aspidobranchiata*: they have (1) a long cerebroid commissure, the ganglia having a forward projection united with that of the opposite side by a subesophageal commissure; (2) the stomato-gastric system arising from this projection and the sympathetic ganglia widely separated; (3) well-developed pedal ganglia and cords; (4) pallial ganglia united with the pedal. These characters are of primordial significance; BOUVIER (1). See also *id.*, (6) pp. 29 & 30 *antea*.

In *Dolabella rumphii* the cerebral ganglia are united by a short commissure and give off six pairs of nerves; the most important are the tentacular, optic, and acoustic. The cerebro-pedal connective is thick, the cerebro-visceral thin. Besides connecting cords, the visceral ganglia give off two pairs of nerves distributed to the integuments and the mantle. There are twelve or thirteen pairs of pedal nerves. The posterior visceral nerves are close together to the right of the middle line, and give off branchial and genital nerves. The distribution of the stomato-gastric system corresponds with the disposition of the digestive tract,

which consists of three principal portions—crop, gizzard, and stomach, each of which is provided with a special armature of hard parts; AMAUDRUT (1).

The nervous system in *Achatina panthera* and *Bulimus funki* is described in detail; the retractor muscles of the central ganglia, described by Sicard in *Zonites*, are probably nerves. In *Vaginula* there is, properly speaking, no sub-cerebral commissure, but there is a filament similar to that called "labial commissure" in *Linnaea*; the visceral chain consists of five (possibly six) ganglia, which furnish an argument against v. Jhering's classification of *Vaginula* along with *Onchidium*; AMAUDRUT (3).

The nerves of the heart in *Helix pomatia* are non-medullated, but have a nucleated sheath. There are two trunks, the larger of which forms a plexus, while the smaller forms a small ganglion of seven or eight cells, and then ramifies in the ventricle. The muscles are accompanied by nerve-fibres throughout their whole length; TRAMBUSTI.

In the nervous system of *Cardium edule* the results of Duvernoy have been confirmed and extended by DROST (1). Four kinds of sensory epithelium were observed: (1) pigmented epithelium sensitive to light; (2) long-haired cells embedded in a depression of the cirrus-point; (3) penicillate cells with short hairs; (4) broad brush-cells projecting through cuticular warts. A distinct hyaline layer is found everywhere below the epithelium of the siphons; their main mass is composed of longitudinal and circular muscles, but there are other fibres at right angles to both these, and two delicate layers just below the epithelium. Bottle-shaped pigmented glands occur in patches at the upper end of both siphons. Two other forms of glands are described; one bottle-shaped on the mantle-margin and below the ciliated epithelium; the other also on the mantle-margin, as well as on the parts covered by the young epicuticle or the shell. The author agrees with Flemming's views on the nature of connective tissue.

8. Organs of Sense.

PATTEN (2) has made the eyes of Molluscs the subject of an elaborate memoir. (I) In *Arca* there are three forms: (1) faceted, aggregated, and placed anteriorly and posteriorly on the mantle edge; (2) invaginate, on the mantle below the opening in the shell through which the byssus projects; (3) pseudolenticulate, occurring irregularly among the invaginate forms. Each individual has about 1300 eyes. The compound (faceted) consist of 10–80 "ommatidia," each of which is wedge-shape and has a central core of two fused retinophoræ and a double refractile rod or perceptive element. These are surrounded by two rows of pigmented "retinulæ," each having a homogeneous cuticle on its outer extremity. The nerve-fibres are connected in a manner described with the pigment cells and with the retinophoræ. The invaginate eyes are thickened portions of the hypodermis, but have the same essential elements as those just described. The pseudo-lenticulate eyes are transitional, forming definite groups of non-invaginate ommatidia, with a prominent lenticular thickening of the cuticle. (II) In *Pecten* the formation of images by the lens has been observed and is described. Some

eyes occur in which the retina is fully developed, though the pigment is continuous across the pupil. (1) The external surface is covered with pigmented epithelium up to the cornea, where it suddenly becomes much thinner; (2) the cornea consists of columnar cells; (3) the iris of larger cells filled with pigment; (4) the stalk is of loose tissue and has enormous blood spaces, with erector and depressor muscles, which are replaced anteriorly by fibres forming a hyaline pseudocornea; the lens consists of a group of mesoderm cells suspended in a large blood sinus. The posterior portion of the organ is a thick concave disc enclosed in a membranous ommateal sac, the cells within which form a closed vesicle with obliterated central cavity. (1) The anterior wall consists of: (a) an outer ganglionic layer; (b) an inner ganglionic layer; (c) the retinophora; (d) rods containing the retinidia. 2. The posterior wall is composed of: (a) an outer vitreous network; (b, c) an argentea made up of two modified layers of cells; (d) a red tapetum. The optic nerve divides into two branches: one enters the eye axially, the fibres forming the axial nerve-fibres of the retinophoræ; the other ascends towards the shell side of the retina, its fibres uniting with the ganglionic layers. The development of the eye in *Pecten* is by transitory cups, probably homologous with the invaginated eyes of *Arca*. Other species are also investigated. In the theoretical part of the work the Molluscan ommatidium is defined as consisting of a double cell, the retinophora, with two nuclei and an axial nerve-fibre. Four types of eyes are recognised—diffuse, invaginate, faceted, and pseudo-lenticulate—and the theory is broached that eyes have originated from "heliophags," or organs for the absorption of solar energy. This memoir has been criticised in the *Quart. J. Micr. Sci.* xxvii, p. 285; the author's reply will be found in *Zool. Anz.* x, pp. 256–261, 1887.

The "eye" of *Pecten* is probably a phosphorescent organ; SHARP.

In *Pecten jacobæus* the thin peripheral margin of the layer of pigment cells passes into the retina, the sensitive region of the optic vesicle being turned away from the light. This difference from other *Mollusca* may be accounted for by the lens in the latter being a secretion formed within the optic vesicle, whilst in *Pecten*, as in the *Vertebrata*, it is of cellular origin, and developed externally to the vesicle; BÜTSCHLI (2).

The retina of *Helix* contains both pigmented and colourless cells; the latter are flask-shaped, and their contents do not stain, but harden to a clear gray mass in osmic acid; they are not regularly polygonal, but intercalated between the others, in all forms from a polygon to a star. The pigmented cells have a clear central space and a homogeneous cell-body, very different from that of the others; the centre is highly refractive; CARRIÈRE.

Onchidium chameleon has small papillæ and no eyes, while *O. dämeli* has three on each papilla; the eyes multiply by division, semi-detached examples not being rare. The lens consists of one cell, and a sphincter muscle for accommodation is present. Below the ganglion-cells of the optic nerve are others which contain highly refractive plano-convex bodies, and below these again other elongated hexagonal cells surrounded by pigment-cells. In a space at the bottom of each hexagonal

cell is a tapering conical rod passing through it and entering the ganglionic layer. There are secondary concave lenses at the upper ends of the facets to counteract the main lenses, which are too powerful for use in air. *O. dämeli* does not retract its eyes on the close approach of foreign bodies, which may indicate that it is far-sighted; LENDENFELD.

In *Pterotrachea* the eye has, roughly speaking, the form of a cylinder, the hinder portion of which has been compressed from above downwards. The hindmost extremity being constituted by a curved boat-shaped appendage, into which the optic nerve passes. The cornea is large and spheroidal, but always destroyed in removing the organ. Pigment has a remarkable distribution; a broad band (broader dorsally than ventrally) with curved margins passes round the eye, and from its lack of pigment has received the name "Fenster;" a darker stria runs along its centre. The pigmented posterior part is separated from the remainder by a distinct ridge (costa) on the inner surface.

The capsule of the eye consists of a structureless cuticle of moderate thickness, the interior being lined with columnar epithelial cells of varying lengths. The retina (1) occupies the posterior boat-shaped portion of the eye, and is not to be regarded as made up of different histological layers, but of one layer, whose elements may be distinguished into pedestals and rods, the former outside, the latter inside a delicate limiting membrane. (2) There is no reason to refer the fibrillar contents of the nucleated section of the retinal cells to a breaking up into nerve fibres, but rather to a formation of "radiculæ" for fixation to the cuticle. (3) The length of the striated pedestals is determined by the height of their insertion into the rods. (4) Since a number of pedestals are connected with each rod, these, like the rhabdoms of *Arthropoda* and *Cephalopoda*, are to be regarded as composite, but the components are disposed one above another, not side by side. Their striation is due to a simple laminar texture. (5) The rods are arranged in longitudinal rows, parallel throughout the whole retina, which (6) is divided into dorsal and ventral halves by a slit. (7) The retina is innervated by a layer of fibres running under the basal ends of its cells; its dorsal portion contains small ganglion cells. (8) The structureless membrana limitans, between the retina and vitreous, gives off fibres which penetrate between the rows of rods. (9) The nervous fibres pass forwards, and can be followed to distinct epithelial processes in the region of the costa; they seem to pass into large cells surrounded by pigment, whose function is doubtful.

An account of the function of the various parts, and a comparison of the organ with that of other *Cephalophora* is added; GRENACHER.

Sepiæ deprived of eyes swim in the usual way, but more slowly; when the otocyst is removed, either with or without the eye, this power is no longer retained, the animal losing control over its actions. These experiments are compared with those of Flourens on rabbits; DELAGE.

9. Generative Organs.

The penis of *Agriolimax maculatus*, from Samarcand, possesses a firmly attached oval calcareous extremity with a double spur; this supports the

theory that the function of the spiculum amoris is to stimulate the other individual in copulation by prolonged cuticular irritation; the peculiarities of the species do not connect it directly with other forms, but point to an independent origin in Central Asia, the home of the genus; SIMROTH (5).

Male genital organs of *Helix* and *Zonites* correspond, except as regards the flagellum; the vagina includes a glandular and a copulatory portion. In *Zonites* the glandular portion is more primitive than in *Helix*; the forms with one duct sac and multifid glands in two packets are the most highly differentiated forms; DUTILLEUL.

The function of the spiculum amoris as copulatory is indicated by the condition in certain species of *Ariophanta* and *Tenentia* described by Semper, where it is perforated; the *Vitrinæ* seem to furnish an intermediate stage, which agrees well with the systematic position they occupy in the *Pulmonata*; SIMROTH (4).

In *Vitrina elongata*, Drap., the spiculum amoris is composed of chitin or conchiolin, and has the form of a curved funnel leading out from a gland; hence it is not homologous with the analogous organ of *Helix*. This is compared with the state of things in other *Vitrinæ*; the glandulæ mucosæ are described, and a classification based on these compared with one founded on the radula. The general anatomy of the genus being taken into consideration, the conclusion is drawn that the "*Vitrinæ* are to be regarded as a divergent stem, perhaps connected at its root with the aulacognathous *Hyalinæ*, and lead on to the *Limacidæ* by continued retrograde metamorphosis"; WIEGMANN.

Copulation of *Limax tenellus*, with figs. of organs; SIMROTH (1), p. 26.

A detailed description is given of a case in which the generative apparatus of *Helix pomatia* was divided into three entirely separate groups; no phylogenetic significance was attributed to the arrangement; BIÉTRIX.

Hectocotylied arm of *Tremoctopus gracilis*, Eyd. & Soul., in early developmental stage described by HOYLE (1), p. 71.

Sexual difference in shells of *Unio*, indicated by STERKI, p. 56.

10. Embryology.

Copulation was observed in captive specimens of *Arion* and *Helix*, but in the latter atrophy of the ova always took place. [1] *Karyokinesis in the sperm-cells of Helix*.—The spindle-fibres are really the persistent framework of the regular coil, the chromatin of which has been concentrated at the equator, while the unstained ground-substance persists *in toto*. The microsomata seem not to be solid, but disposed on the framework of the coil like pearls on a string. The spindle is formed from the coil-framework by the concurrence of the individual segments of the latter in one point at the poles, thereby becoming more stretched, and entering into intimate connection with the protoplasmic masses. When division is slow the pole-plates can be seen to separate from the spindle-fibres and become regular nuclei; the spindle fibres contract towards the

equator, fuse together and form triangular or hook-shaped structures attached by the apex to the equator. After division this structure retreats towards the centre, and the limbs of the hook form a closed figure, the accessory nucleus ("Nebenkern"). An analogous process is observed where the protoplasm does not divide. The framework of the coil, the spindle-fibres and the accessory nucleus have a genetic connection, being all modifications of the same element. The process may be summed up as follows: "After the chromatin of the nucleus has divided into microsomata, these arrange themselves into regular curved rows; the accessory body enters the nucleus and forms the framework of the coil, the latter as the spindle-fibres; while the chromatin concentrates in the granular equatorial plates, the spindle-fibres come into direct connection with the protoplasm at the poles; after division of the chromatin substance, the resulting pole-plates form anew regular nuclei, and the 'anaphasis' either repeats inversely the stages of the 'prophasis,' or the accessory nuclear body arises directly from the spindle-fibres," according to the extent to which the protoplasm takes part in the division. Carnoy and Gilson's investigations are criticised. [2] *Oogenesis and spermatogenesis in Arion*.—In the earliest stages a primitive sexual-cell is a homogeneous substance; granules form in it and granular protoplasm around it. These form (a) primitive ova, (b) spermatogonia and basal cells, (c) nutritive yolk-cells, (d) reserve germs. The peripheral cells are ova, and the central zone spermatogonia, characterized by the presence of a single large nucleolus. The accessory body is an outgrowth of the nucleus; it has a distinct membrane, and the chromatin is irregularly distributed within it. The ova have a larger quantity of protoplasm and a larger nucleus; they increase in number as in *Helix*. The nucleus contains the germinal spot and another round body, the nucleolus. The accessory nucleus disappears in the ripe ova, and the spindle-fibres are formed from unstained substance contained in the germinal spot. The mature ova lie in scattered groups with spermatogonia between them, the intermediate substance being composed of connective tissue cells; the reserve germs, however, do not originate from these, but from the sexual cells. [3] *Oogenesis in Helix*.—The ova are formed at intervals, and when ripe exhibit a single germinal spot. The nutritive cells are at first in contact with the ova, but afterwards lie in cavities and cannot be distinguished from the surrounding protoplasm. There is no vitelline membrane; PLATNER (1).

In *Arion empiricorum* the period between fertilization and egg-laying is variable; two yellow folds in the uterus mark the position where the albumen is deposited; the cavity of the uterus contains many spermatozoa; polar bodies are present, usually three, the result of the division of two; they possess distinct membranes; their formation regarded as a necessary prelude to fertilization, but independent of it. Sperm usually penetrates at the vegetative pole away from the germinal vesicle; only one sperm seems to be effective, subsequent ones disappear; the head followed by the tail approaches the germinal vesicle within which nucleolus-like "karyosomata" have formed. These are united by unstained bridges which afterwards disappear. The head of the sperm

now comes to a depression in the wall of the germinal vesicle, and at length separates from the tail; the head splits longitudinally, each half being visible within the vesicle. There is only one aster associated with the segmentation nucleus, but a second afterwards appears. The phenomena of division are similar to those observed in *Helix*; PLATNER (2).

Embryology of Patella.—The mature ova (0.12 mm.) have a thick chorion radially striated. The micropyle is a large irregular opening, from the bottom of which arise two large polar globules; one of these has a rounded extremity with an indistinct nucleus. Segmentation is on the usual molluscan type. Two unequal parts are first formed, both of which divide successively; a third division at right angles to these produces successively stages with five, six, seven, and eight spheres. The blastosphere has four large cells at the vegetative pole, which form the rudimentary endoderm, and at the beginning of gastrulation grow inwards and assume a wedge-like form; they then expand into club-shaped cells which almost fill the segmentation cavity. Two cells become ciliated and form the apical plate, while the velar cilia are developed around the equator. A large "endo-mesoderm" cell now appears on each side of the endoderm, thus rendering the embryo bilaterally symmetrical. Each of these cells now divides, one moiety becoming the primitive mesoderm cell, the other forming a part of the lining of the mesenteron. The number of cells in the mouth of the blastopore now increases to eight, and it begins to move towards the future ventral surface, occupying the apex of a V-shaped furrow directed towards the velum. The cells which constituted the walls and floor of this V afterwards form the stomodæum. There is a lateral swelling on either side of the blastopore, and as it moves forward these unite behind it so as to form a median protuberance, the future foot. The velum increases by the formation of support cells, while the shell-gland has appeared even before the closure of the blastopore, and includes most of the dorsal surface behind the velum. On either side of the embryo cap is a cell with a bunch of long, straight hairs, perhaps sensory in function. The coelom appears as a space between the mesenteron and ectoderm; the shell-gland becomes invaginated, and a nautiloid shell appears on the dorsal aspect of the embryo, the foot becomes more prominent, and the otocysts appear. A very large percentage of the embryos develop abnormally, so that the investigation could not be completed; PATTEN (1).

The development of *Fissurella* is described by BOUTAN, with illustrations; an abstract taken from a preliminary communication will be found in Zool. Rec. xxii, *Moll.* p. 39.

The fertilized ovum of *Doris* has been watched during its passage down the oviduct; it enters a large canal with branching tubes, lined with irregular nucleated cells; in this "albuminous gland" it receives its first coat. The next portion is the "shell gland," and has smaller cells, these two constituting the "opaque portion" (Hancock) of the albumen-gland. Next are convoluted tubes with a single layer of elongated granular cells, secreting the jelly which unites the eggs into a string. *D. testudinaria* has a prostatic gland; BOLOT.

Prior to the segmentation in *Loligo pealii*, the protoplasm collects at one pole, forming a germinal disc, which divides throughout its thickness. It then splits into two layers, ectoderm and mesoderm, the former of which alone is present in the future long axis of the embryo, in which region also endoderm cells become separated off. Endoderm cells are not formed spontaneously from the yolk. The ectoderm and endoderm surround the whole yolk, while the mesoderm extends only halfway round; BRUCE.

The egg-capsules of *Fulgur* contain each 12 or 14 eggs, with a quantity of albuminous material, which appears to be a proteid. Sometimes all the eggs develop, but, in other cases, a large number serve as food for the rest. The non-developing eggs neither segment nor disintegrate, but are ingested whole by the other embryos. A single polar body is formed early and contains yolk-granules. The first two divisions are into equal parts, after which four completely protoplasmic micromeres are separated off. The macromeres do not divide any further, but new micromeres are developed and the gastrula is formed by epibole. The formation of the polar body is regarded as dependent upon the relative amount of yolk and protoplasm. Segmentation in *Platyhelminthes*, *Annelida*, *Mollusca* and *Molluscoidea* seems to be referable to a common type. The velum is developed from paired ventral ectodermic folds; in many forms it consists of a preoral band of large cilia, and a postoral band of smaller ones. The "head-kidney" is absent in *Fulgur*, but present in *Paludina* and *Bithynia*; the secreting cells perhaps originated as part of a preoral velar area. The cerebral and pedal ganglia develop as usual from thickenings of the ectoderm; the latter have no connection with the byssus gland. The typical apical thickening is found in pulmonates but not in *Prosobranchiata*; McMURRICH (2).

In an early developmental stage of *Sepia* there is below the digestive tract a space bounded above by the mesoderm, below by the vitelline membrane; it contains cells derived from the vitelline membrane and also free nuclei which do not form cells but result from cells the contents of which have swollen up and become invisible. Two cœlomic cavities pass, one on either side, between the branchial hearts and the median arterial heart. Their inner walls afterwards form the pericardium and their outer walls the envelope of the branchial hearts; thickenings in the walls of these latter give rise to the pericardiac gland, while the generative glands arise on the hinder margin of the cœlomic sacs. A comparison is instituted between this and the state of affairs in *Cyclas*; SCHIMKEWITSCH.

In the *Stylommatophorous Pulmonata* the rudiment of generative organs may be observed in larvæ just before extrusion as a fine cord of cells with a distinct lumen, at the side of the right cerebral ganglion; this, the primary duct, elongates, and the hermaphrodite gland appears further backward: these are both mesoblastic in origin. The duct and gland unite, and the penis is developed as a cœcal diverticulum of the former. In animals 4-5 mm. long, the vas deferens grows out from the penial sac, the primitive duct splits into male and female portions, and the outer genital aperture is formed. Primitive ova are also developed in

the hermaphrodite gland. By the time the animals are 7-9 mm. long the organs have assumed their permanent form, except that the receptaculum seminis does not appear until a length of 12 mm. has been reached. The generative apparatus of the *Stylommatophora* is more primitive than that of the *Basommatophora*; the temporarily-separated portion of the duct appears to correspond with the male ducts of closely allied forms; the genital aperture is the homologue of the female aperture of the *Basommatophora*; the penis and vas deferens are recent acquisitions, having been developed since the *Pulmonata* separated from the main stem of the *Gastropoda*. The disposition of the generative organs, which is permanent in the *Prosobranchiata*, is temporary in the *Pulmonata*; in these latter they are laid down on the female plan, and only become hermaphrodite by subsequent modifications. Three forms of cells have been found in the foot-gland of the adult. The "sensory" cells of Sochaczewer have not this function, but are the boundaries of the apertures of glandular cells; these are arranged in two chief masses, one on either side of the efferent duct. Calcareous cells were present in the liver from the commencement. The foot is continuously ciliated, and cilia are also present in the right mantle-margin in the region of the respiratory cleft; BROCK.

BÜTSCHLI (1) differs from Spengel as to the mode of rotation by which the chistoneural arrangement of the *Prosobranchiata* has been produced. The asymmetry concerns not only the nervous system but also the intestine and anus; the latter has been displaced forwards on the right side in consequence of the presence of the shell. At a certain stage of development, while the anus is still posterior, a narrow dorso-ventral zone on the right side between it and the mouth ceases to grow; the growth of the left side continues, and the longer this takes place the more is the anus displaced towards the head. The region of suppressed growth extends beyond the anus as far as the left gill, which thus participates in its displacement. The visceral sac also undergoes an independent torsion.

Development of chromatophores has been studied in *Sepiola rondeleti*; radiating fibres are not muscular but connective. A vesicle appears in the centre of a mass of yellowish pigment and coloured granules collect in it; the cells around this vesicle are arranged radially: their nuclei elongate, their protoplasm forms fibrils, and their inner ends become continuous with the central cell. The movement of the coloured granules in the vacuole has given rise to the idea that the chromatophores are amœboid; PHISALIX.

Mytilus: some further details on development are given by WILSON (1, 2) [*cf. Zool. Rec. xxii, Moll. p. 99*].

Growth of *Loligo* most marked in posterior half of body; HOYLE, (1) p. 156.

In *Limnaeus auricularis* the fusion of the first two segments of a dividing egg has been observed as a pathological phenomenon by ZACHARIAS.

11. *Stray Biological Notes.*

The occurrence of poisoning by mussels at Wilhelmshaven has given rise to numerous papers and articles. MÖBIUS (1) gives an account of a comparison of the mussels from Kiel and Wilhelmshaven; he does not admit the existence of two varieties. Details of physiological experiments with them are recorded by FALCK, while DROST gives the results of some analyses. LOHMEYER (1) establishes a n. var. *striatus* of the *Mytilus edulis* for the poisonous mussels, and lays stress upon the probability of their having been imported into the harbour at Wilhelmshaven; he also points out that the poisonous property does not depend upon the systematic difference, but upon the individuals having lived in unfavourable surroundings; it is, however, more often found in the variety than in the typical form. In another paper (2) he recapitulates the diagnosis of his variety of the *M. edulis*. The question of varietal or specific distinctions in the poisonous mussels of Wilhelmshaven is discussed, with many quotations by KOBELT (10), and the probability that some are transported *Mytilus galloprovincialis* shown. VON MARTENS (6) does not accept the hypothesis of two distinct varieties, but thinks the differences observed are merely individual, due to varying habitat, &c.; he gives a number of references to previous instances. SCHULZE also is opposed to the hypothesis of two varieties. The poison of *Mytilus* has been examined; both aqueous and alcoholic extracts are poisonous; there is a non-poisonous base, producing salivation and diarrhoea, and a poisonous decomposition product, which belongs to the ptomaines: BAUMERT. BRIEGER has isolated this and names it "Mytilotoxin." WOLFF (2) communicates that not only the mussels but starfish from Wilhelmshaven were poisonous if taken from certain points in the harbour, and that the virulence was greater the more stagnant the water; the poisonous nature of the mussels diminishes at certain seasons; he concludes that the property depends on living in stagnant water, and shows that the poison does not exist ready-formed in the water; discussion also reported. He also states (1) that poison resides only in the liver. VIRCHOW (1) sums up the contributions, repeating the conclusion that when the mussels are seen *en masse*, certain peculiarities are visible, which are less noticeable in the normal mussels than in the poisonous ones; the poisonous specimens lose their dangerous character when kept for some time in aquaria: *id.* (2). [See also anonymous articles in Rev. Sci. xxxvii, p. 605; *MT. für die Küsten- und Hochsee-Fischerei, 1886, Jan., No. 1; *Weser-Zeitung, 1885, No. 14009; *Die Natur, 1886, No. 6; Science, vii, pp. 175 & 176.]

Specific distinctness of *M. galloprovincialis* maintained by BRUSINA.

Mollusca from warm and cold areas compared; MURRAY.

Laws of colouration of Styrian *Limaces* summed up thus:—1, The further north, the simpler the markings, so far as black is concerned; 2, mountains are more favourable to brilliant colouring than the plains; 3, in the north the red of youth is extinguished in the winter, in the south it is retained, and further developed in the summer; 4, in mountains and in the south the colour of youth is retained longer than in

plains and in the north ; 5, the full development of a red and black covering takes place only in the Southern Alps ; SIMROTH (7).

SIMROTH (8) calls attention to a case in which the black pigment is lacking in *Paludina vivipara*, even in the eyes, the red pigment being strongly developed.

Black specimens, supposed to be *Arion empiricorum*, from Spain, would seem exceptional to the rule that this species is black in the north, red in the south ; they appear, however, to be a distinct, though allied, species ; SIMROTH (3).

Limax arborum has been observed spotted with black on the plains, but of normal colouration on the hills ; COCKERELL (13).

Arion ater (young) change colour according to their surroundings ; ROBERTS (4) ; see also COCKERELL (10).

Anodonta mutabilis, colour of gills a varietal character ; SCHLICHTER.

Variations in colour in confinement ; COLLINGE.

Many described varieties of *Arion flavus* due to varying states of contraction ; SIMROTH, (1) p. 17.

Numerous varieties due to isolation on an island, as observed in the Rhone, are discussed by PERROUD.

SAUNDERS agrees with Cunningham that left (convex) valve of Oysters is usually uppermost [see Zool. Rec. xxii, *Moll.* p. 42] ; and explains differences of opinion by a detachment of the Oyster during its first or second year, and subsequent fixation in an inverted position.

List of 50 *Gastropoda* and 34 *Pelecypoda* which form food of fishes ; INGERSOLL, pp. 693 & 703.

Several *Mollusca* obtained from herrings' stomachs ; BROOK & CALDERWOOD. 24 species recorded from the haddock, BROOK (1) ; 12 from the cod, *id.* (2).

Notes on a few common species in aquaria ; WATERS.

CERTES (1, 2) claims for Puységur, 1880, priority in discovering all important points regarding the green oysters. See also RYDER (1), pp. 735-742.

A snail weighing $\frac{1}{4}$ oz. can drag up vertically a weight of $2\frac{1}{4}$ oz., another weighing $\frac{1}{4}$ oz. could drag 17 oz. horizontally ; SANDFORD.

Specimens of *Nassa obsoleta* survived a year's exposure to a heated wall surface ; HEILPRIN.

Testacella is driven out of the soil when it is sodden with moisture, and becomes encysted when the soil is dry ; POULTON.

Helix arbustorum more abundant in mild dry evenings, *H. nemoralis* after rain ; SCOTT, p. 78.

Teredo nausitoria reputed to live in the river Comer in perfectly fresh water ; GARDNER.

Conch (*Fulgur carica*) feeds upon oysters by crushing the shells ; INGERSOLL, p. 695.

Urosalpinx cinerea and other forms drill holes in the shell ; mode of attack by star-fish described ; TARR.

Oysters preyed on by *Sabelluria vulgaris*, VERRILL, in Report of Commissioners, *vide* p. 27, *antea*.

Limnea stagnalis devours sticklebacks ; ULLYETT.

Squids attacking herring. Rep. Fish. Scot. iii, App. F, p. 67.

Thecosome Pteropoda live on minute pelagic organisms, captured by ciliary action; lists of contents of their alimentary canals given by BOAS, (2) p. 33.

Gymnosomata are rapacious, and fragments of *Thecosomata* have been found in their stomachs; *id. l. c.* p. 147.

Concholepas and *Stylina* parasitic on *Linckia multiformis*; SARASIN.

Several Mollusks, *inter alia* *Mytilus edulis* and *Tellina baltica*, found in stomach and excrement of *Phoca annellata*; NEHRING. Others in stomach of turtles; POUCHET & DE GUERNE.

Numerous Mollusks, both marine and land and freshwater, mentioned as occurring in the stomachs of gulls; EGBERS.

Meleagrina margaritifera infested by a variety of *Mollusca* and *Annelida*. A specimen of *Pinnotheres* has been found entirely embedded in the nacre; WOODWARD.

A specimen of *Fierasfer* was found embedded in the shell of *Margaritina margaritifera*, the process having been completed before any decay took place; GÜNTHER.

Erosion of shells of *Planorbis* attributed to deficiency of calcium carbonate in the water; SHRUBSOLE.

Mode of swimming of *Argonauta*; BENEDICT.

Eggs of *Anodonta* carried about by a small fish; "F. G. S."

Sphaerium, sp., carried about by Frogs; COCKERELL (17).

Planorbis corneus favoured the growth of *Ouvirandra fenestralis*, Thouars, by eating an Alga which was growing on its leaves; MERKEL.

7 new species (1 new genus) described from specimens in amber, by KLEBS (2), with indication of nearest living species and its habitat.

12. Abnormalities.

Calyptrea spirata is a monstrosity of *C. chinensis*, due to its living in soft mud, where the only basis of support is *Turritella communis*; this reaches only a breadth of 12 mm., so that the *Calyptrea* is limited to these dimensions; when free it attains twice the diameter; KOBELT (9).

Abnormal *Anodonta piscinalis*; KOBELT (17), p. 99, pl. vii, fig. 1, *Helix hispida* (adherent tentacles); ROBERTS (6). *Planorbis vortex*; WOTTON (3).

Gulnarina peregra, monstrous forms observed by ESMARCK & HOYER, p. 112, pl. vi, figs. 10-15. See also COCKERELL (7); WILLIAMS (4).

MODES OF COLLECTING AND PRESERVING.

Collecting Mollusks in North Africa is treated by KOBELT (5); calcareous rocks are the most frequented, and holes and chinks must be carefully examined.

Collecting and preserving of *Mollusca*; MOSELEY.

Preservation of *Mollusca* in alum; NOLL, p. 32.

Mollusks killed in water with 1 p.c. alcohol, air being excluded; after 12 to 24 hours, more alcohol is gradually added; FIEKERT.

See also GRAY & WOODWARD.

NOMENCLATURE.

The evils arising from premature publishing of MS. names, and of fine drawn distinctions, especially in palæontology, are forcibly illustrated by WILLIAMS.

Varietal nomenclature discussed, WOODWARD; ROBERTS (1).

SCHRÖDER complains that Bourguignat has published species under his name without his consent.

GEOGRAPHICAL DISTRIBUTION.

LAND AND FRESH-WATER MOLLUSCA.

I.—PALÆARCTIC ZONE.

WESTERLUND continues his work, treating of the families *Testacellidæ*, *Glandinidæ*, *Vitrinidæ*, and *Leucochroidæ* (1); *Ampullaridæ*, *Paludinidæ*, *Hydrobiidæ*, *Melanidæ*, *Valvatidæ* and *Neritidæ*, *id.* (2); *Olausilia*, etc., *id.* (3).

North Temperate Region. Critical remarks on Jordan [Zool. Rec., xxi, *Moll.* p. 7]; SIMROTH (1), p. 32.

1. *Septentrional Region.**Norway.*

Arctic Region. 50 species (3 new) enumerated, with notes and localities; ESMARCK & HOYER. See also ESMARCK.

British Isles.

Origin of Molluscan fauna treated by COCKERELL (8). KOBELT (3) disagrees with the classification of the *Mollusca* according to their origin here adopted.

Britain. List of 11 slugs with numerous vars., WILLIAMS (2). Criticisms on and replies; COCKERELL (8), WILLIAMS (3), & TOMLIN (3).

Britain. Range of *Pupa ringens*; TAYLOR (3).

Gairloch. List given by MCMURTRIE.

Tarbert, Loch Fyne. 50 species and varieties collected by SCOTT.

Isle of Man. 2 slugs; MOORE, J.

Yorkshire. Account of species of *Planorbis* continued by NELSON & TAYLOR. *Arion subfuscus*, *Helix hispida*; ROBERTS (2). *Paludina connecta*, GAIN. *Helix lactea*, TAYLOR (2).

Teesdale. 24 species added to Ashford's list; HUDSON (1).

Middlesborough. 2 slugs; *id.* (3).

Clapham, Yorks. 42 species recorded; RICHARDSON.

Wakefield. 1 slug; ROBERTS (5).

Pontefract. Additional species; *id.* (3).

Llandudno. 7 species added to Roebuck's list; TOMLIN.

Clonmel. Few species; COCKERELL (11).

Louth, Lincolnshire. COCKERELL (17).

Leicester. *Unio tumidus*, var. *ponderosa*, Pascal; QUILTER.

Nottinghamshire. *Paludina contecta* ; GAIN. *Helix cantiana* ; MUSSON.
Vertigo moulinsiana ; TAYLOR (1).

Shropshire. *Arion ater*, var. *albo-lateralis* ; HUDSON (3).

Cardiff. About 90 species recorded ; WOTTON (1). 1 slug ; *id.* (2).

Somerset. *Succinea oblonga* ; TAYLOR (4).

Wiltshire. 42 species ; COCKERELL (5).

Dorset. *Helices* of ; COCKERELL, T. D. A. (1).

Surrey. *Helix obvoluta* ; COSTA.

Margate. *Cyclostrema nitens* ; COCKERELL, S. (2).

Skelligs and Valentia. Several species ; COCKERELL (14).

Holland. *Dreissensia cochleata* in the brackish waters of the Amstel ;
 PEELSENEER (1).

France.

Clausilia, 5 new species ; COUTAGNE. *Helix striata*, Müll. (*nec* Drap.) ;
 LOCARD (2).

Normandy. 57 species, several hitherto unrecorded ; COCKERELL, S. (1).

Cubados. Several species and varieties recorded by BALLÉ.

Channel Islands. *Bulimus obscurus* ; TOMLIN (2).

Charente inférieure. See BELTREMIEUX.

Haute Garonne. 12 species ; FAGOT (1).

Ariège, 32 species ; FAGOT (1).

Germany.

Brandenburg. 135 species (112 univalves, 23 bivalves), most interesting,
Hyalina alliaria, *Conulus praticola*, *Helix candicans*, *Pupa arctica*, *Planorbis vorticulus*, *Bithynella steinii*, *Valvata macrostoma* ; REINHARDT (4).

Rhine. *Cionella acicula* ; GOLDFUSS (2).

Kirn, near Kreuznach. *Daubardia brevipes*, Fér. ; BETTGER (3).

Giessen. 7 species additional to previous lists ; ECKSTEIN.

Niederhessen. See DIEMAR.

Nassau. 25 species and many varieties added to fauna ; most interesting—*Hyalina draparnaldi*, *Helix tenuilabris*, *H. unidentata*, *Pupa substriata*, and *Paludina fasciata* ; *Unio*, *Margaritana* : n. spp. KOBELT (17).
Margaritana freytagi, n. sp. ; *id.* (4).

Rotenburg. See EISENACH.

Kösen. *Daubardia heldii* and *D. rufa* ; GOLDFUSS (1).

Muldethal. *Daubardia brevipes* ; SIMROTH (9).

Bad Landeck. 47 species enumerated by THAMM (1).

Unterfranken. 133 species enumerated, with notes by SANDBERGER (1).

Aschaffenburg. 4 new species, *Vitrella* ; FLACH (2).

Aschaffenburg and neighbourhood. 127 species enumerated, with
 notes and exact localities ; FLACH (1).

Federsee. Varieties of *Anodonta* ; SCHLICHTER.

Fichtelgebirge. 23 species ; SANDBERGER (3).

Bamberg. 110 *Gastropoda*, 18 *Pelecypoda* (12 new to the district) ;
 SCHEDEL.

Lej Sgrischus (2640 metres high). *Pisidium foreli*, Clessin ; IMHOF (2).

Serneus. 28 species recorded ; AM STEIN.

Austro-Hungary.

A list of 447 species given by BRUSINA (2).

Kremsmünster. See PFEIFFER.

Russia.

Baltic Region. 6 species (4 Gastropods, 2 Pelecypods) additional to previous fauna (*Zool. Rec. xx. Moll.* pp. 2 & 22), also a list of species from the same region and the Province of Pskov; BRAUN (1).

Estonia. 9 species of *Clausilia*; SCHMIDT.

Dobruzscha. 26 species (2 new); CLESSIN, (1) pp. 50-56.

Caucasus. 71 species (3 new, and a few n. varr.); BETTGER (7).

Northern Asia.

Central Russia and Afghanistan. *Buliminus* (4 new species); ANCEY (7, 8); prelim. notice (3).

Siberia. 7 species (2 new) of *Valvata* enumerated by DYBOWSKI (3), with remarks on the discrepancies of previous lists.

Talysch. 75 species (69 Gastropods, 6 Pelecypods); BETTGER, (9, 10) pp. 343-348, compared with other faunas.

2. *Circummediterranean Region.**Spain and Portugal.*

Coimbra. 74 species from the neighbourhood enumerated by NOBRE (2).

Portugal. *Anodonta*, 29 species (17 new); SILVA E CASTRO.

Serra Estrella. *Arion hispanicus*, n. sp., SIMROTH, (1) p. 21.

Basins of Tagus and Sado. 75 species recorded by NOBRE (3).

Algarve. 4 new species (*Helix* 1, *Cæcilianella* 3); MALTZAN (1).

Gibraltar. *Parmacella* from, COCKERELL, T. (3).

Bayona. 14 species enumerated by HIDALGO (1).

Panticosa. See FAGOT (3).

Catalonia. 38 species (11 new); FAGOT (2). *Helix*, n. sp., *Pupa*, 4 n. spp.; BOFILL.

Majorca. 2 *Helices*, 1 *Hyalina*, *Pupa*, n. sp.; MORAGUES.

France.

See GRANGER.

Montpellier. *Empusa egena*, GOLDFUSS (3).

Pyrénées orientales. 30 species; FAGOT (1).

Aude. About 30 species; *id. t. c.*

Var. 3 new species from Le Luc; FLORENCE.

Toulouse. See FAGOT (4).

Italy.

Piedmont. Supplementary list with 2 new species; POLLONERA (2).

Lake Garda. 6 species from a depth of 30 fathoms; IMHOF (1).

Bergamo and Brescia. See ADAMI.

Val Vestino. Few species reported; GREDLER (3).

Mt. Argentaro. 54 species (7 new); PAULUCCI.

Sardinia. *Helix*, n. spp. and varr., MALTZAN (2) *Agriolimax*, n. sp., SIMROTH, (2) p. 319.

Sicily. *Helix*, n. spp., MALTZAN (2).

Lampedusa, 12 species, among others *Helix* (*Pomatia*) *mazzulii*, and *Clausilia Lopedusæ Calcarata* [?]; REINHARDT (1).

Austria.

Upper Carinthia. 32 species collected by REULEAUX.

South-west Croatia. A former list (see Zool. Rec. xvii, *Moll.* p. 5) has been increased to 113 species; comparative remarks on neighbouring faunas are given; 23 forms indicated as new to the district; HIRC.

Styria. SIMROTH (7) describes colour variations of *Limaces*, and attempts to explain them by climatic conditions; records *L. tenellus*, *Arion nivalis*, and *Agriolimax agrestis*. *Clausilia grimmeri* (Parr), type and new variety in several localities; TSCHAEPEK.

Northeast Coast of the Adriatic. Remarks on the Molluscan fauna of; *Pomatia oostoma*, Westerl., new to district; HIRC, pp. 387-389.

Eastern Istria and Veglia I. 36 species (none new) enumerated by *id. t. c.* pp. 385-387.

Dalmatia. 23 species (1 *Helix*) enumerated by BÆTTGER (5). 3 species *Tanousia* redescribed; LETOURNEUX. 4 species (*Amalia*, n. sp.), CLESSIN (2).

Moldavia. 22 species; *id.* (1) pp. 49 & 50.

Roumania. 27 species, additional to former lists; *id.*, (1) pp. 165-168.

Turkey and Greece.

Corfu. *Helix soccaliana*, n. sp.; LETOURNEUX.

Cephalonia. *Limax*, n. sp.; SIMROTH, (2) p. 329.

Thessaly. Numerous species (5 new, *Helix*, *Clausilia*, *Unio*) recorded by SPUSSINER & BÆTTGER; also BÆTTGER (6).

Parnassus. *Amalia*, n. sp.; SIMROTH, (2) p. 321.

Black Sea.

Crimea. 79 species (8 new) enumerated as washed up on the shores; RETOWSKI (2). *Helix*, n. sp. *id.* (1).

Asia Minor.

Armenia. *Limax armeniacus*, n. sp.; SIMROTH, (1) p. 27.

Taurus Mts. *Clausilia* (*Oligoptychia*) *amaliæ*, n. sp.; BÆTTGER (2).

Marocco. *Helix duroi*, n. sp.; HIDALGO (2).

Egypt. 12 subfossil forms (2 new, *Limnæa*, *Unio*); v. MARTENS (4).

N. Africa. KOBELT (1) concludes the sketch of his excursion, mentioning several species, *inter alia*, *Clausilia virgata*, Montagu, p. 101, *Pomatias*, n. sp., and *Helix*, n. sp. and varr.

3. Central Asiatic Region.

Turkestan. *Buliminus*, 16 species (7 new), *Rumina*, 3 species; ANGEY (7, 8).

Talysch Mts. 75 species (69 *Gastropoda*, 6 *Pelecypoda*), several new; BÆTTGER (9, 10).

4. Chinese Region.

China. MÜLLENDORFF (2) records, with critical remarks, a long list of land-shells, with 13 new species, chiefly from the provinces of Hubei, Hunan, and Queichow; notes on many of Houde's species; see also *id.* (1). 12 species of *Melania* (1 new); BÆTTGER (4). 5 species of *Neritina*, with notes; *id.* (8).

Hunan and Hoop. 8 new species; GREDLER (2).

Yichang. *Cyclotus fossor*, n. sp.; HEUDE (1).

Chen-kew. *Clausilia*, 9 new species; *id. t. c.* pp. 296-302.

Yunnan. *Vivipara*, 5 new species from Lake Ta-li; MABILLE (3).

Tali-foo. *Clausilia*, 5 new species; *Cyclophorus*, *Helix*, 7 new species: HEUDE, (1) pp. 296-302.

Hué. 20 new species described with figs. by WATTEBLED.

Chen-tu-fu. *Helix pinchoniana*, n. sp.; HEUDE (1).

Tonking. 57 species (15 new); MORLET (3).

Nankin and Central China. HEUDE (2).

5. Japanese Region.

Japan. 5 species of *Melania* (1 new); BÆTTGER (4).

Japan and Corea. Shells collected by Gottsche, with 8 new forms (*Hydrocena*, *Unio*, *Melania*, *Limnæa*) described; MARTENS (2).

Tokio. *Helix (Acanthinula) harpula*, n. sp.; REINHARDT (3).

Nagasaki. *Hyalinia möllendorffi*; *id. t. c.*

6. Atlantilean Region.

Santiago, Cape Verde Is. *Bulimus subdiaphanus*; NOBRE (1).

Gran Canaria. 18 species; HIDALGO, (4) p. 520.

II.—PALÆOTROPICAL AFRICAN ZONE.

7. Central African Region.

Tunganyika. 18 Gastropods, 7 Pelecypods; the fauna does not prove a recent connection with the ocean; PELSENEER, (4) pp. 112-115. Numerous new species of *Unio* and *Iridinidæ* diagnosed by BOURGUIGNAT (1).

Usagara. *Ennea*, n. spp.; CROSSE (2).

Zambesi and Luapula. 6 new species (*Helix*, *Lanistes*); FURTADO (4).

Kalahiri Desert. 6 species (5 new; *Buliminus*, *Pupa*, *Unio*); BÆTTGER, (11) pp. 22-28.

Angra Pequena. 2 species (1 innom.); *id. t. c.* pp. 16-18.

8. West African Region.

Upper Senegal. 30 species (13 new species, 3 new genera, *Bellanya*, *Reneus*, *Pharaonia*); JOUSSEAUME (1).

Ilha do Principe (W. Africa). *Achatina bicarinata*, Lmk.; NOBRE (1).

St. Thomas (San Thomé), W. Africa. *Nanina welwitschi*, Morlet; NOBRE (1).

Congo. 16 new species (new genera, *Chelidonura* and *Zairia*); ROCHE-BRUNE.

Rio Coroca (W. Africa). *Limnaea bocageana*, Morlet; NOBRE (1).

Novo Redondo (W. Africa). *Bulimus ferussaci*; *id. t. c.*

Rio de Oro. *Helix duroi* var. *minor*; HIDALGO, (4) p. 518.

9. South African Region.

Cape Town. *Helix aspersa* on Table Mountain; BORCHERDING.

10. Malagasy Region.

Madagascar. 17 new species (*Helix*, *Cyclostoma*, *Bulimus*), 1 new genus (*Anceyiella*); MABILLE (1). *Bulimus herculeus*; *id. t. c.*

III.—PALÆOTROPICAL ORIENTAL ZONE.

13. Indo-Chinese Region.

Cambodia. 2 new species (*Helix*, *Bulimus*); MORLET (2).

Cochin China. *Opisthoporus simonianus*, n. sp.; HEUDE (1).

15. Philippine Region.

Philippines. *Cochlostyla*, 3 new species, *Venerupis*, n. sp.; HIDALGO (3), CROSSE (4). *Quadrassia hidalgoi*, n. g. & sp.; CROSSE (5). 7 new species of *Leptopoma*; KOBELT (2). *Helix linnaeana*, Pffr.; ANCEY (6).

Falow Is. *Partula newcombianum*, n. sp.; HARTMANN.

IV.—AUSTRALIAN ZONE.

16. Austro-Malayan Region.

New Guinea. A list of the land and freshwater forms, with local faunas based on Tapparone-Canefri and other writers, is given by KOBELT (8). 24 n. spp.; TAPPARONE-CANEFRI. Few species; *Batissa*, 2 new species; REINHARDT (2).

Maclay Coast. 9 species (5 new, *Helix*, *Paludina*, *Melania*); BRAZIER (2).

Woodlark I., New Guinea. *Partula similis*, *P. woodlarkiana*, new species; HARTMANN.

Celebes. *Nanina* species, 1 new variety; MARTENS (3).

12. Australian Region.

Australia. Brief sketch of Molluscan fauna; MACLEAY.

19. Polynesian Region.

New Caledonia. *Placostylus savei*, n. sp.; CROSSE (6).

New Hebrides. *Partula*, 3 new species; HARTMANN.

Solomon Is. *Partula*, 8 new species; HARTMANN.

Santo Espirito Is. *Partula* (*Diplomorpha*) *de-la-touri*; *id. t. c.*

V.—NEANTARCTIC ZONE.

21. Patagonian Region.

Orange Bay. 2 new species (*Patula*); MABILLE (1).

VI.—NEOTROPICAL ZONE.

25. Brazilian Region.

Brazil. *Bulimulus*, n. sp.; MARTENS, (5).

Rio Grande do Sul. *Peltella palliolum* (Fér); JHERING (1).

Para. *Geostilba blundiana*, n. sp.; CROSSE (3).

26. Mexican Region.

Mexico. *Physidae*, *Thalassophila* discussed, and *Cyclophoridae* commenced; FISCHER & CROSSE.

Guatemala. 3 new species (*Cælocentrum*, *Cistula*, *Cylindrella*); MARTENS (5).

Honduras. 19 species (7 new); ANCEY (9).

27. Caribbean Region.

Trinidad. *Diplommatina occidentalis* probably indigenous, having been found in a limestone breccia; GUPPY.

Bahamas. *Helix filicosta*, Pfeiffer; ANCEY (6).

VII.—NEARCTIC ZONE.

28. Atlanto-American Region.

United States. List of recently introduced and universally distributed species; BINNEY, pp. 23 & 24.

Central Province. 57 forms (3 new species) enumerated, with figures and notes; *id.*

Niagara. *Helix pulchella*, COCKERELL, T. (2).

Michigan. 230 species (3 new); DECAMP. Discursive notes; WALKER.

Iowa. *Gundlachia meekiana*, Stp., *Pyrgula scalariformis*, Wolf; PILSBRY (1).

Illinois. *Pyrgulopsis*, n. g. & sp.; CALL & PILSBRY.

Kansas. List of fresh-water species; CALL (1). *Unio popenoi*, n. sp., *id.* (2).

Texas. *Pyrgulopsis*, n. g. & sp.; *Hydrobia*, n. sp.; CALL & PILSBRY.

New Orleans. Notes on a few species; PILSBRY (2).

29. *Californian Region.*

California. *Selenites calata*, n. sp., MAZYCK.

Pacific Province. 83 forms enumerated and many figured, with notes, by BINNEY.

30. *Canadian Region.*

Labrador. *Limax* (2 species), *Pupa*, *Zonites* from Ungava Bay ; DALL (1).

Ottawa. Exact localities of and notes on 42 species ; LATCHFORD.

MARINE MOLLUSCA.

Oceanic Areas.

The general subject of deep-sea *Mollusca* is treated by DALL (4). Large shells are rare in deep water, and those which occur are very delicate ; nearly all are thin and fragile, with faint colours and delicate sculpture ; sometimes thin blister-like elevations are found on the shells. The tissues of the animals are soft and gelatinous. The greatest wealth of *Mollusca* is to be found in the archibenthic zone ("continental area" of Agassiz), intervening between the littoral and abyssal regions. The soft mud of the sea-bottom affording no resting-place for them, the stems of hydroids and the spines of echinids are used. Nearly all are flesh-eaters, living upon dead organisms, not on each other. There is "in the deep sea a very wide range of variation in form and sculpture within the specific limits of" what are termed "the 'flexible' species, and an almost complete uniformity over very wide areas of the forms which we may consider as inflexible species." See also PERRIER.

WATSON, pp. iv & v, sums up evidence of 'Challenger' collection regarding distribution. Depth has considerable influence in this regard, but temperature more ; pressure is not so important. "The occurrence of a living species in a fossil state will always justify the expectation of its having a wide local distribution, and *vice versa*." "There are existing species whose distribution is universal." There is "no proof . . . of progressive permanent and essential change in Molluscan development."

Many genera are mentioned by CHIERCHIA. See also PICAGLIA.

Bathymetrical distribution of *Cephalopoda* discussed, and evidence adduced to show that certain forms (*Cirrotheuthis*, *Bathyteuthis*, *Mastigoteuthis*, &c.) are truly abyssal ; HOYLE, (1) pp. 230-234.

Notes on deep-sea Chitons are given by HADDON (1) pp. 1-3 ; *Leptochiton benthus*, n. sp., comes from 2300 fathoms in the North Pacific, the greatest depth from which any member of the group has yet been recorded.

Oceanic *Mollusca* of Gulf Stream ; see VERRILL, p. 592.

List of species from coast of U. S. given by BUSH (1).

Atlantic Ocean. 3 new Pteropods ; BOAS, (2) pp. 80, 152, & 160. *Marsenia*, n. sp., BERGH, (1) p. 16.

North Atlantic. Deep-water, 4 species (2 new); WATSON, p. 694. *Taonius hyperboreus*, Stp.; HOYLE, (1) p. 191.

Mid Atlantic, 1850 fath. 5 species; WATSON, p. 697.

S. W. of Sierra Leone, 2500 fath. *Clathurella* (*Daphnella*) *monoceros*; *id. ibid.*

South Atlantic, 1425 & 2650 fath. *Clathurella cala*, *Stylifer brychius*, n. spp.; *id. t. c.* p. 722.

Mid South Atlantic, 1900 fath. *Ianthina rotundata*, Leach; *Pleurotoma aganactica*, n. sp.: *id. t. c.* p. 699.

Indian Ocean. 2 new Pteropods; BOAS, (2) pp. 84 & 152.

Southern Ocean, 1375 & 1600 fath. *Fusus setosus*, *F. calathiscus*, *Pleurotoma staminea*, *P. papyracea*, *Guivillea alabastrina*, *Trochus infundibulum*, WATSON, p. 701. 1260-2600 fath.: *Trochus brychius*, *Pleurotoma lepta*, *Dentalium leptoskeles*, *id. t. c.* pp. 703 & 704.

Pacific Ocean. 2 new Pteropods; BOAS, (2) pp. 84 & 170. *Marseniopsis*, n. g.; BERGH, (1) pp. 14 & 18.

North Pacific, 2300 fath. *Leptochiton benthus*, n. sp., HADDON (1) p. 10 (= *Chiton alveolus*, Sars, WATSON, p. 719).

Mid-Pacific, 1070-2050 fath. 6 species (*Dentalium*, *Basilissa*, *Cithna*, *Pleurotoma*), most new; WATSON, pp. 717 & 719. *Enoplateuthis margaritifera*, Rüpp.; HOYLE, (1) p. 171.

South Pacific, 2160 fath. *Dentalium keras*, Wats.; WATSON, p. 720, 600-1150 fath.: 15 species (few new); *id. t. c.* p. 707.

1. Arctic Province.

Arctic Sea. 7 Nudibranchs (2 n. spp., 1 n. g.); BERGH (3). *Marseniella*, n. g., *id.* (1), p. 14. 30 species of *Pelecypoda*, none new, recorded by CATTIE.

Jan Mayen. 50 species from all groups (3 new); BECHER.

Kara Sea. 28 species (3 n. spp., *Sipho*, 1, *Buccinum*, 2); PFEFFER.

Bering Sea. 23 Gastropods, 4 n. spp.; DALL (3).

Commander Islands. 41 species of all groups from Bering Island, and a complete list for the group; *id.* (2).

Labrador. 2 Pteropods, 9 Gastropods, 8 bivalves (*Aquilonaria*, n. g.), from Ungava Bay; *id.* (1).

2. Boreal Province.

Norway. Few Mollusca mentioned by NOLL.

North Sea. 47 species, mostly *Pleurotomidae*, *Cancellariidae*, and *Rissoide* (12 new), 1 n. g. (*Asbjörnsenia*); FRIELE.

Tromsö. 75 additional species, none new; SCHNEIDER.

Varangerfjord. 51 *Gastropoda*, 5 *Polyplacophora*, 3 *Scaphopoda*, 38 *Pelecypoda*, enumerated by DE GUERNE.

Faeroe Channel. Comparative lists of Mollusca from warm and cold areas; MURRAY. *Octopus piscatorum*, Vll., *O. arcticus*, Prosch; HOYLE (1), p. 91. *Tracheloteuthis rüsei*, Stp., *id. t. c.*, p. 164; 3 *Pteropoda*, PELSENER (3).

Off Halifax. 5 species; WATSON, p. 694.

3. *Celtic Province.*

- British Isles.* List compiled by SOMERVILLE.
Gairloch. List given by McMURTRIE.
Tarbert, Loch Fyne. List of *Mollusca* of all groups; BROOK & SCOTT.
Arran. Few species mentioned by HENDERSON.
Isle of Man. List of 70 species collected by HERDMAN (2), pp. 337-339.
Dublin Bay. Occurrence of *Octopus vulgaris* discussed; HADDON (2).
Liverpool Bay. List of all groups; DARBISHIRE, HERDMAN, HOYLE (3).
Scilly. A number of additions and corrections to a list previously published [Zool. Rec. xxii, *Moll.* pp. 20 & 55], given by SMART & COOKE.
Holland. *Corambe batava*, n. sp.; KERBERT.

4. *Iusitanian Province.*

- France.* A complete catalogue of the species, with localities, descriptions of numerous new species, and bibliography, is given by LOCARD (1).
 Monograph of species of *Tupes*; *id.* (3). See also GRANGER.
North of France. GIARD continues his account of the fauna, commencing the *Gastropoda*.
Channel Islands. 22 species additional to Dupuy's list: 6 Nudi-branchs from Guernsey, 30 *Gastropoda*, 18 *Pelecypoda*, from shell sand of Herm; KÖHLER.
N.E. of Spain. 328 species enumerated by HIDALGO (1), pp. 398-414.
Bayona. 111 species enumerated; *id. op. cit.*
Tagus and Sado. 190 species of all groups enumerated, with notes, by NOBRE (3).
Off Setubal. 8 species; WATSON, p. 691.
Le Roussillon. *Gastropods* and *Scaphopods* are completed; BUCQUOY, DAUTZENBERG, & DOLLFUS.
Adriatic. A number of species recorded by Jeffreys from this region are not admitted by BRUSINA, *inter alia*, *Spondylus gussoni*, *Pecten philippii*, *Mytilus pictus*, *Macula aegeensis*, *Cardita corbis*, *Astarte triangularis*, *A. digitaria*, *A. bipartita*, *Lutraria oblonga*, *Solen pellucidus*, *Mya truncata*, *Scissurella crispata*, *Gibbula cineraria*, *Littorina litorea*, *Rissoa dictyophora*, *R. parva*, *Natica sordida*, *Cancellaria cancellata*, *Chenopus serreseanus*, *Bittium lacteum*.
Volo. *Columbella rustica*, L., *Conus mediterraneus*, Brug., *Pisania maculosa*, Lmk.; BÖTTGER, (6) p. 73.
Mouth of the Rhone. Brackish water species; MARION.
St. Vincent, C. Verde Is. 9 species; WATSON, p. 696.
Gran Canaria. 1 Cephalopod, 9 *Gastropods*; HIDALGO, (4) p. 519.
Teneriffe. 37 species; WATSON, p. 691.
Gomera. 6 species; *id. t. c.* p. 692.
Palma. 13 species; *id. t. c.* p. 696.
Azores. 6 species, many new; *id. t. c.* p. 695. Deep-water (1000-1675 fath.), 50 species, some new; *id. t. c.* pp. 695 & 696.

5. *Aralo-Caspian Province.*

- Caspian Sea.* Few recent marine *Mollusca* noted; JAMIESON.

6. West African Province.

Guinea. 19 species enumerated by REYES Y PROSPER.

Gold Coast. 7 species, *Ampullaria*, n. sp.; MARTENS (3).

Rio de Oro. 20 species; HIDALGO, (4) p. 518.

Ascension I. 8 species; WATSON, p. 722. *Octopus occidentalis*, Stp.; HOYLE, (1) p. 77.

7. South African Province.

Cape of Good Hope. About 30 species, few new; WATSON, p. 700.

Port Elizabeth. 165 species (10 new) of various groups; SOWERBY (2).

Tristan da Cunha. 24 species (many new); WATSON, p. 699. *Plaxiphora carpenteri*, n. sp.; HADDON (1), p. 34.

Abyssinia and Zanzibar. 32 species (*Pecten raffrayi*, n. sp.); ANCEY (1).

Comoro Is. *Trochus*, n. sp.; FISCHER (2).

Mauritius. *Scalenostoma lubrica*, n. sp.; *id.* (4).

8. Indo-Pacific Province.

Gulf of Suez. Enumeration of M'Andrew's collection, with notes, is continued by COOKE (2), and the Molluscan fauna discussed in regard to its origin, and 17 species common to Red Sea and Mediterranean recognized; *id.* (3).

Ceylon. *Octopus granulatus*, Lmk.; HOYLE, (1) p. 80.

China Sea. One new Pteropod; BOAS, (2) p. 152. *Turritella fascialis*, Menke; TRYON, (1) p. 197.

Hong Kong. *Octopus areolatus*, de Haan; HOYLE, (1) p. 86. *O. punctatus*, Gabb; *id. t. c.* p. 100.

Phillipines. About 70 species (some new); WATSON, pp. 716 & 717. *Leptochiton belknapi*, Dall (from 1050 fath.); HADDON, p. 10.

Admiralty Is. *Cerithium martinianum*, Pffr., *Dolium perdx* (L.), *Trochus paradoxus* (Born.), *Phos naucratoris*, n. sp., and 6 other species; WATSON, pp. 707, 717, & 718.

Amboina. 16 species, few new; *id. t. c.* p. 715. *Enoploteuthis margaritifera*, Rüpp.; HOYLE, (1) p. 171.

Arafura Sea. 50 species, some new; WATSON, pp. 714 & 715. *Octopus areolatus*, de Haan; HOYLE, (1) p. 86.

Cape York and neighbourhood. About 170 species, many new; WATSON pp. 710-714.

Fiji Is. About 100 species, many new; *id. t. c.* pp. 708-710: *inter alia*, *Turbo smaragdus* (Martyn); *id. t. c.* p. 125.

New Hebrides. *Natica* (*Neverita*) *albumen* (L.); *id. t. c.* p. 710.

Tongatabu. 28 species, few new; *id. t. c.* p. 708: *inter alia*, *Trochus* (*Monilea*) *belcheri*, Phil.; *id. t. c.* p. 71.

New Caledonia. *Trochus* (*Minolia*) *semiustus*; FISCHER (2). *Scalenostoma mariei*, n. sp.; *id.* (4).

Tahiti. 7 species; WATSON, p. 720.

Honolulu. 20 species, many new; *id. t. c.* p. 719.

Formosa, Sumbawa, N. Celebes, Moluccas, Waigiou. Lists given by GUILLEMARD.

9. *Australo-Zealand Province.*

Australia. Brief sketch of Molluscan fauna: MACLEAY. 5 species of *Murex* and 1 of *Typhis* (none new) described, with notes, by BEDNALL.

Melbourne. 6 species; WATSON, p. 704.

Port Philip Bay. *Lamellaria wilsoni*, n. sp.; SMITH (5).

Tasmania. 2 new species (*Pecten*, *Diaphanna*, *Cassia*); PETTERD (1): 2 new species (*Ancillaria*); *id.* (2).

Bass Strait. 30 species, several new; WATSON, p. 704.

Port Jackson. About 120 species, many new; *id.* pp. 704 & 705.

New Zealand. 16 species, some new; *id.* p. 707: *inter alia*, *Trochus* (*Diloma*) *porcifer* (A. Ad.); *id. t. c.* p. 67. *Calliteuthis reversa*, Vll.; HOYLE, (1) p. 183. *Chromodoris amœna*, n. sp.; CHEESEMAN. *Argonauta bulleri*, n. sp.; KIRK.

Kermadec Is. *Elodone verrucosa*, Vll.; HOYLE, (1) p. 104.

10. *Japanese Province.*

Japan. 24 species; WATSON, pp. 718 & 719. *Acanthopleura* (?) *incana* (Gld.); HADDON, (1) p. 25. *Turritella fascialis*, Menke; TRYON, (1) p. 197. *Octopus punctatus*, Gabb; HOYLE, (1) p. 100. *Calliteuthis reversa*, Vll.; *id. t. c.* p. 183. *Cephalopoda*; APPELLÖF.

12. *Californian Province.*

Todos Santos Bay and San Diego. 1 Cephalopod (*Octopus punctatus*), numerous Gastropods (2 n. spp.) and Lamellibranchs enumerated by ORCUTT [cf. (281) Zool. Rec. xxii, *Moll.* p. 17].

13. *Panamic Province.*

Panama. One new Pteropod; BOAS, (2) p. 62.

Nicaragua. *Octopus tehuelchus*, d'Orb.; HOYLE, (1) p. 89.

14. *Peruvian Province.*

Peru and Chili. *Concholepas*, n. spp; MABILLE (2).

Chilian Coast. Two new Pteropods; BOAS, (2) pp. 160 & 161.

Valparaiso. 4 species; WATSON, p. 720. *Chiton murrayi*, n. sp.; HADDON, (1) p. 21.

15. *Antarctic Province.*

Messier Channel and neighbourhood. 6 species, most new; WATSON, p. 720. *Lepidopleurus dalli*, n. sp.; HADDON, (1) p. 19.

Strait of Magellan. 2 species; WATSON, p. 721.

Falkland Is. 13 species; *id.*, *ibid.*

Prince Edward Is. 24 species, some new; *id.*, pp. 700 & 701. *Lepidopleurus dorsuosus*, n. sp.; HADDON, (1) p. 18.

Kerguelen Is. 65 species, many new; WATSON, pp. 701-703. *Lep- tochiton kerguelensis*, n. sp.; HADDON, (1) p. 12.

Heard Is. 16 species, some new; WATSON, p. 703.

16. Patagonian Province.

Off Monte Video. 6 species; WATSON, p. 721.

17. Caribbean Province.

West Indies. "Blake" *Pelecypoda* enumerated by DALL (4), with 12 new subgenera and 81 new species. *Octopus tehuelchus*, d'Orb; HOYLE, (1) p. 89.

Bahamas. Few species mentioned; BROWN.

Sombrero Is. 13 species; WATSON, p. 692.

Culebra Is. About 100 species, many new, from one dredging; *id.*, p. 692; *inter alia*, *Stomatella (Gena) caliginosa*, H. & A. Ad.; *id. t. c.* p. 111.

Fernando Noronha. 16 species; *id.* p. 697. *Ischnochiton boogii*, n. spp.; HADDON, (1) p. 15.

Brazil. 6 *Nudibranchiata*, 2 new species, 2 new genera; JHERING (2).

Off Pernambuco. 80 species, many new; WATSON, pp. 697 & 698.

Bahia. *Fusus marmoratus*, Phil., *Marginella fulminata*, Kien.; *id.* p. 699.

18. Transatlantic Province.

Western N. Atlantic. 17 *Cephalopoda*, about 120 *Gasteropoda*, 13 *Pteropoda*, 8 *Scaphoda*, about 70 *Pelecypoda*, no n. spp., recorded, with depths, by BUSH (1); also similar list, VERRILL, and of shallow water forms from Cape Hatteras, BUSH (2), with 7 new species.

New Jersey. *Modiola tulipa*, new so far north; FORD (1).

Narragansett Bay. Notes on a few species; *id.* (2).

Bermuda. 12 species, several new; WATSON, p. 694.

PALEONTOLOGY.

ROULE (2) gives a list of 61 species (8 new) from the French lacustrine deposits.

97 species are common to the recent and Pleistocene faunas of Unterfanken; SANDBERGER (2).

Several species, including *Lithoglyphus naticoides*, Fér., recorded from the diluvium near Berlin; GOTTSCHIE.

Cardium edule and *Dreissensia polymorpha* in the desert of Karakum, and still living in the Caspian; JAMIESON.

Recent and fossil forms from Anticosti; GRANT & DAWSON.

For Australian Tertiary *Mollusca* may be mentioned two papers by TATE, Tr. R. Soc. S. Austr. viii.

For other papers on the more recent fossils, see the following in

list of titles, *antea* :—BELLARDI, CORNET, DOLLFUSS & DAUTZENBERG, GIOLI, HUTTON, LOMNICKI, POLLONERA, RUTOT, SACCO (2), VINCENT.

For Bibliography see MARCOU.

HISTORICAL CHANGES.

Zonites albanicus was found abundantly in one locality in California 30 years ago, but not since, probably the progeny of an importation ; TRYON, (2) p. 135.

An important paper on the subfossil shells of the United States and their relation to geological and climatic changes has been published by COOPER.

Littorina litorea, probably introduced into North America about 30 years back ; GANONG.

Helix aspersa has appeared on the Table Mountain, Cape Town ; BORCHERDING.

Two specimens of *Bulimus (Orphnus) larguillerti* imported from Brazil with dye-wood ; BÆTTGER (1).

Modiola tulipa seems to be extending northwards on the U. S. coast ; FORD (1).

Transportation of *Mytilus galloprovincialis* by ships (see p. 45).

Account of attempts to introduce *Venus mercenaria* into the Mersey and Dee ; MOORE.

Failure of two attempts to transplant American oysters in the Little Belt ; THAMM (2).

Dreissensia cochleata, Kickx, not now found in Belgium, occurs in the brackish waters of the Amstel ; PELSENER (1).

USE BY MAN.

The *Mollusca* of France in their economic relations are briefly treated by BROCCHI, and ostreiculture somewhat more fully.

The utilitarian aspect of North American Mollusks is treated by INGERSOLL (1).

Arcachon has 4000 hectares (nearly 10,000 acres) of oyster beds ; annual value 8 or 10 million fcs. ; 1884-85, 178,359,000 were exported ; SIMONIN.

Mode of taking the eggs and impregnating them is described by RYDER ; in addition to a general résumé of our knowledge on the rate of growth, food, local variations, and other matters. A method of collecting spat in baskets ready for transport described ; *id.* (2).

Report on oyster culture in Connecticut, *vide* p. 27, *antea*.

Cockle supply of North Uist ; Rep. Fish. Scot. iv, App. G, p. 290.

Transplantation and fishery of *Unio margaritiferus*, JAPP.

Purpura lapillus used as indelible writing fluid ; INGERSOLL, p. 699.

Scallop fishery ; *id.* (2).

Notes on certain Mollusks used as bait ; McINTOSH.

Mytilus collected in quantities at Conway and boiled to get seed pearls ; DARBISHIRE, p. 241.

Uses of shells by the Papuans enumerated by REINHARDT (2).

Shell-work of American tribes discussed and compared with that of other countries ; BUCKLAND.

Necklaces of shells of various species were found round skeletons in the caves of Baoussé, Roussé, and Cro Magnon ; CARTAILHAC.

Cyrena shell used for severing the umbilical cord ; MAN.

Busycon perversum, *Natica* and *Marginella* found in graves to which they must have been conveyed overland 1,500 miles ; BELL.

CEPHALOPODA.

A catalogue of all recent species of *Cephalopoda* (388 species, 68 genera) is given by Hoyle (1 & 4) ; the following classification is adopted :—

I.—DIBRANCHIATA.

I. OCTOPODA.

(a.) *Lioglossa*, fam. *Pteroti*.

(b.) *Trachyglossa*, fams. *Amphitretidæ*, n., *Argonautidæ*, *Philonexidæ*, *Alloposidæ*, *Octopodidæ*.

II. DECAPODA.

(a.) *Myopsida*, fams. *Sepiolini*, *Sepiarii*, *Loliginei*.

(b.) *Egopsida*, fams. *Ommastrephini* (sub. ff. *Ommastrephidæ*, *Mastigoteuthidæ*), *Onychii* (sub. ff. *Onychoteuthidæ*, *Gonatidæ*), *Taonoteuthi*, *Cranchiæformes*.

III.—TETRABRANCHIATA.

Fam. *Nautilidæ*.

Divided as regards their distribution into (1) Pelagic, (2) Littoral, (3) Abyssal, and lists of all recent species given arranged in 17 regions ; *id.* (1) pp. 211–224.

Natural history, taken mainly from Verrill ; Ingersoll, (1) pp. 687–693.

OCTOPODA.

PTEROTI.

Stauroteuthis, Vll., almost certainly = *Cirroteuthis*, Hoyle (1), p. 60.

AMPHITRETIDÆ (n. fam.).

For *Amphitretus pelagicus*, *id. t. c. p.* 67.

ARGONAUTIDÆ.

Argonauta sp., on the Gulf weed ; Benedict. *A. bulleri*, n. sp., New Zealand, Kirk.

Ocythoë tuberculata, Raf., is adopted (following Steenstrup) for the species known as *Octopus* (*Philonexis*) *catenulatus*, *O. carena* and *Parasira catenulata*, *id. t. c. p.* 5.

ALLOPOSIDÆ.

Alloposus, Verrill, probably = *Haliphron*, Stp.; *id. t. c.* p. 73.

OCTOPODIDÆ.

Bolita microcotyla, Stp., n. sp., Atlantic; *id. t. c.* p. 16.

Cistopus bursarius, Stp., n. n. = *Octopus indicus*, d'Orb. (*nec* Rapp); *id. t. c.* p. 14.

Eledone cirrosa (Lmk.), synonymy discussed; *id. t. c.* p. 102.

Japetella diaphana, Hoyle, referred to *Eledonella*, Vll.; *id. t. c.* p. 107.

Octopus, systematic characters of the genus, discussed by *id. t. c.* pp. 74-76. *O. argus*, Krauss., = *O. horridus*, d'Orb.; *id. t. c.* p. 9. *O. occidentalis*, Stp., n. sp., Ascension, Cuba; *id. t. c.* p. 77. *O. incertus*, Targioni-Tozzetti, = *O. granulatus*, Lmk.; *id. t. c.* p. 80. *O. areolatus*, de Haan (= *O. sinensis*, d'Orb., *O. ocellatus*, Gray), described and figured; *id. t. c.* p. 86, pl. iii, figs. 6 & 7. *O. megalocyathus*, Phil. (?), Cunningham, Punta Arenas, = *O. tehuelchus*, d'Orb.; *id. t. c.* p. 89. *O. bairdii*, Vll., = *O. arcticus*, Prosch, and perhaps *Sepia grænlandica*, Dewh.; *id. t. c.* p. 91. *O. maculosus*, Hoyle, 1883, = *O. pictus*, Brock; *id. t. c.* p. 92. *O. verrilli*, n. n. = *O. pictus*, Vll. (*nec* Brock); *id. t. c.* p. 93. *O. hongkongensis*, Stp., Hoyle, 1885, = *O. punctatus*, Gabb; *id. t. c.* p. 100. *O. globosus*, n. sp., Japan, Appellöf, p. 7, pl. i, figs. 4 & 5. *O. cuvieri* and *O. ocellatus*, Gray, Japan; *id. t. c.* pp. 6 & 8.

Schizoctopus, Stp., n. subg. of *Octopus*, umbrella between the dorsal arms very short, and the cutaneous sculpture continued over its inner surface; Hoyle, (1) p. 81.

DECAPODA.

MYOPSIDA.

SEPIOLINI.

Rossia papillifera, Jeff., = *R. glaucopis*, Lovén; *id. t. c.* p. 116. *R. patagonica*, Smith, described and figured; *id. t. c.*, p. 119, pl. xv, figs. 10-18.

Rossia mölleri, Stp., and *R. glaucopis*, Lovén, Jan Mayen, jaws and radula figured; Becher, p. 81, fig. 9.

Rossia tenera (Vll.) does not belong to *Heteroteuthis*, Gray; Hoyle, (1) p. 118.

Sepiola bursa, Pffr., probably = *Iniotheuthis morsei*, Vll.; *id. t. c.* p. 112.

Iniotheuthis morsei, Vll., described and figured; Appellöf, p. 15, pls. ii, figs. 15 & 16, & iii, figs. 16, 19, 20, & 23.

SEPIARII.

Sepia. Descriptive anatomy of shell and distribution of genus; Hoyle, (1) pp. 123 & 222: see also Riefstahl, pp. 31 & 32, *antea*.

Sepia plangon, Gray, described ; Hoyle, (1) p. 128. *S. mestus*, Gray, and *S. capensis*, Gray (*nec d'Orb.*) figured ; *id. t. c.* pp. 135 & 136.

Sepia peterseni, *S. tullbergi*, n. spp., Japan, Appellöf, pp. 23 & 26, pls. ii & iii. *S. esculenta*, *S. kubiensis*, Hoyle, redescribed and figured ; *id. t. c.* pp. 20 & 28, pl. iii.

Sepia tullbergi = *Metasepia*, Hoyle, (1) p. 148.

Sepiella maindroni, Rochebr., figured ; *id. t. c.* pl. xxii, figs. 1-10.

LOLIGINÆ.

Loligo pfefferi, n. n., = *L. brevipinnis*, Pffr. (*nec Lesueur*) ; *id. t. c.* p. 29.

Loligo bleekeri, Kef., redescribed and figured ; Appellöf, p. 31, pl. i, figs. 7-10.

Sepioteuthis lessoniana, Fér., Japan, *id.* p. 31.

CEGOPSIDA.

OMMASTREPHINI.

Architeuthis, sp. seen in Mount's Bay, Cornwall ; Millett.

Entomopsis, Rochebr., probably = *Tracheloteuthis*, Stp. ; Hoyle, (1) p. 36.

Todarodes pacificus, Stp., figured ; *id. t. c.* pl. xxviii, figs. 1-5 : see also Appellöf, p. 35, pl. iii, figs. 8-10.

Tracheloteuthis riisei. Stp. (= *Verrilliola gracilis*, Pffr.), from Færoe Channel, described and figured ; Hoyle, (1) p. 164, pl. xxviii, figs. 6-12.

ONYCHII.

Enoploteuthis margaritifera, Rüpp., Amboina and Pacific Ocean, tentacle figured ; *id. t. c.* pl. xxix, fig. 11.

Teleoteuthis, n. g. (= *Onychia*, Lesr. *præocc.*), Verrill, Bull. U. S. Fish Comm. 1879 (1882), p. 70. *T. caribbaea*, Lesr., includes *Loligo laticeps*, Owen, *Cranchia pellucida*, Rang, and probably *Onychia binotata*, Pffr. ; Hoyle, (1) pp. 40 & 172.

Gonatidae, n. subfam. for *Gonatus fabricii*, Licht., synonymy discussed ; *id. t. c.* p. 174.

Lestoteuthis fabricii [= *Gonatus*.—REC.], Bering Island ; Dall (2).

TAONOTEUTHI.

Chiroteuthis. Fragments of a large pen from the Pacific referred to this genus ; Hoyle, (1) p. 178.

CRANCHIÆFORMES.

Cranchia reinhardtii, Stp., figured and synonymy discussed ; *id. t. c.* p. 184, pl. xxxi, fig. 11-14, pl. xxxii, figs. 1-4.

Megalocranchia maxima, Pffr., probably a *Taonius* ; *id. t. c.* p. 45.

Taonius hyperboreus, Stp., figured ; *id. t. c.* pl. xxxii, fig. 12, pl. xxxiii,

figs. 1-11. *T. elongatus*, Stp., n. sp., described and figured; *id. t. c.* p. 189, pl. xxviii, fig. 13.

Taonius suhmi (*Procalistes suhmi*, Lankester) discussed and figured; *id. t. c.* p. 192, pl. xxxii, figs. 5-11.

PTEROPODA.

The memoir of Boas (2) is a valuable monograph of this group. The author considers that the *Pteropoda* are really *Opisthobranchiata*, and that the *Thecosomata* and *Gymnosomata* should be dissociated from each other and placed in this order as suborders or tribes; for them the new names *Eupteropoda* and *Pterota* are proposed. No support is given to the alliance between *Cephalopoda* and *Pteropoda* maintained by various writers. Nervous system, Pelseneer, (5) *cf.* pp. 19 & 28, *antea*.

GYMNOSOMATA.

Boas (2) places these also near the *Tectibranchiata*, but cannot decide their more precise affinities. He classifies them directly into the following genera:—

Pneumodermon (3 spp.), *Spongobranchæa* (1 sp.), *Dexiobranchæa* (4 spp.), *Clione* (1 sp.), *Clicopsis* (2 sp.), *Halopsyche* (1 sp.), and *Thliptodon* (1 sp.).

Pelseneer (2) divides the *Gymnosomata* thus:—

1. *Pneumonodermatidæ*, containing *Pneumonoderma*, *Dexiobranchæa*, *Spongiobranchæa*.
2. *Clionidæ*, containing *Clione*.
3. *Halopsychidæ*, containing *Halopsyche* (= *Eurybia*).
4. *Notobranchæidæ*, containing:—

Notobranchæa, n. g.: only one posterior branchia, composed of three crests (one dorsal, two lateral), the dorsal alone fringed. Posterior and anterior lobes of the foot long and narrow, the latter free in their posterior two thirds; for *N. macdonaldi*, n. sp., Atlantic. The genus also includes *Clio capensis*, Rang.

Nervous system of most of these forms described; *id.* (5).

Clicopsis grandis, n. sp., Pacific Ocean, Boas, (2) p. 170.

Dexiobranchæa (Boas, see Zool. Rec. xxii, *Moll.* p. 64), *simplex*, n. sp., Chili, *id. t. c.* p. 160. *D. paucidens*, Atlantic Ocean, *id. t. c.* p. 160. *D. polycotyla*, n. sp., Chili, *id. t. c.* p. 161.

Halopsyche, Bronn, takes precedence over *Psyche* and *Eurybia*, Rang, and *Theeurybia*, Bronn; *id. t. c.* p. 171.

Pneumodermon macrocotylum, n. sp., Atlantic and Indian Oceans and China Sea; *id. t. c.* p. 152.

Thliptodon, n. g., for *T. gegenbauri*, n. sp., a larval form described by Gegenbaur (Unters. ü. Pterop. u. Heterop., p. 95); *id. t. c.* p. 174.

THECOSOMATA.

Boas (2) regards these as nearly related to the *Tectibranchiata*, and especially to the *Bullidæ*. No sufficient proof of their existence prior to

the tertiary epoch is established. They are classified in three families as follows :—

Limacinidae : 1 genus—*Limacina* (6 spp.).

Hyalæide : 3 genera—*Ouvierina* (1 sp.), *Cleodora* (12 spp.), *Hyalæa* (11 spp.).

Cymbuliidae : 2 genera—*Cymbulia* (1 sp.), *Tiedemannia* (1 sp.).

For fossil *Pteropoda*, see Kittl; and for critical remarks on some forms of these, Dollfuss & Ramond.

Cavolinia trispinosa, Færoe Channel, most northerly locality recorded ; Pelseneer (3).

Cleodora includes *Styliola*, Less., *Creseis*, Rang ; Boas, (2) p. 54. *C. chierchiae*, n. sp., Panama, *id. t. c.* p. 62. *C. andree*, n. sp., S. Atlantic, *id. t. c.* p. 80. *C. pygmæa*, n. sp., Indian and Pacific Oceans, *id. t. c.* p. 84.

Cuvierina, n. n. for *Ouvieria*, Rang (*præocc.*) ; *id. t. c.* p. 131.

Hyalæa rotundata, n. sp., hab. ? , *id. t. c.* p. 129. *H. tridentata* found in stomach of *Thalassochelys caretta*, L. ; Pouchet & de Guerne.

GASTROPODA.

PULMONATA.

STYLOMMATOPHORA.

GEOPHILA.

AGNATHA.

TESTACELLIDÆ.

Palæarctic species of *Testacellidæ*, defined by Westerlund, (1) pp. 1–9.

Daudebardia brevipes, Fér., from Muldethal ; Simroth (9) : found near Kreuznach ; Boettger (3). *D. heldii* and *D. rufa*, from the Höllenthale, near Kösen ; Goldfuss (1).

Ennea subringens, n. n., *E. usagarica*, *E. galactochila*, Crosse [*cf. Zool. Rec. xxii, Moll. p. 65*], redescribed and figured ; Crosse, (2) p. 82, pl. i, figs. 1–3. *E. microstoma*, Möll., note on ; Gredler, (1) p. 18. *E. bourguignatiana* said to have priority over *E. subringens*, Crosse ; Ancy (5). *E. (Elma) sinensis*, n. sp., Hunan ; Möllendorff, (2) p. 179, pl. v, fig. 12.

Streptaxis fischeri, n. sp., Tonking, Morlet, (4) pp. 259 & 274, pl. xii, fig. 1.

Streptostyla thomsoni, n. sp., Honduras, Ancy, (9) p. 257.

GLANDINIDÆ.

Glandinidæ, palæarctic species defined by Westerlund, (1) p. 9–14.

GNATHOPHORA.

SELENITIDÆ.

Selenites celata, n. sp., California, contrasted with *S. duranti*, Newcomb ; Mazyck.

Trigonochlamys semiplumbeus, n. sp., Caucasus, Boettger, (7) p. 126.

LIMACIDÆ.

Agriolimax is thus divided by Simroth, (1) p. 30 :—

A. Without intestinal cæcum.		
<i>melanocephalus</i> ,	Penis without gland and exciting bodies.	Original colouration.
Caucasus,		
<i>dymczewiczii</i> ,	Penis with gland, without exciting bodies.	
Crimea,		Colouration variable.
<i>maltzani</i> ,	Penis with gland, with exciting bodies.	
Portugal,		
<i>lævis</i> ,	Penis with gland, saccular dilation, and exciting bodies.	Colouration variable.
Cosmopolitan,		
B. With intestinal cæcum.		
<i>altaicus</i> ,	Penis without exciting bodies, with simple cæcal gland.	Original colouration.
Altai,		Colouration pale, tending to yellow.
<i>fedtschenkoi</i> ,	Penis with exciting bodies and simple cæcal gland.	
Turkestan,		Colouration dark.
<i>berytensis</i> ,	Penis with exciting bodies and acinous gland.	
Syria,		Variable.
<i>agrestis</i> ,	Penis with exciting bodies and richly acinous gland.	

Agriolimax altaicus, n. sp., Altai Mts., Simroth, (1) p. 28, pl. i, figs. 13 & 14, and (3) p. 4. *A. sardus*, n. sp., Sardinia, *id.* (2) p. 319, pl. x, fig. 8. *A. agrestis*, interesting variation; *id.* (6) p. 76.

Amalia hellenica, n. sp., Parnassus, Simroth, (2) p. 321, pl. x, fig. 9. *A. reuleauxi*, n. sp., Dalmatia, Clessin, (1) pp. 46 *et seqq.*: anatomical details given by Simroth, (1) p. 32, pl. i, figs. 8 & 9. *A. gagates*, Drap., n. varr., Williams (1).

Conulus sphaera, *filocinctus*, *cuneus*, *pyramis*, referred to *Kaliella*; *C. bifilaris* and *petasus-sinensis* to *Sitala*; *C. infracinctus*, perhaps = *Streptaxis cavicola*, Gredler; Möllendorff (1), p. 103. *C. utillensis*, n. sp., Honduras; Ancey, (9) p. 238.

Guillainia, Bourgt., 1885, is anticipated by Crosse, 1884; Crosse, J. de Conch. xxvi, p. 243.

Helicarion (?) *capelloi*, n. sp., Luapula, Africa; Furtado, (4) pp. 141–143, pl. vi, fig. 1.

Hyalinia oropensis, Italy, p. 47, *H. diducta*, Lampedusa, p. 49, *H. majori*, Mt. Argentaro, p. 50, *H. sylvicola*, Tuscany, p. 59, *H. alhambræ*, Granada, p. 62, *H. pilula*, Giglio, p. 71, n. spp; Westerlund (1). *H. majori*, Mt. Argentaro, p. 12, pl. i, fig. 1, *H. pilula*, I. Capraia, p. 14, pl. i, fig. 3, n. spp.; Paulucci. *H.* (?) *lineata*, Say, is a *Helix*; Sterki, (1) p. 15. *H. (Polita) derbentina*, n. sp., near Caspian Sea; Boettger, (7) p. 130, fig. 3. *H. (P.) decipiens*, n. sp., Caucasus, *id. t. c.* p. 131, fig. 1. *H. (P.) stabilei*, n. sp., Piedmont; Pollonera (2). *H. (P.) caspia* figured; Boettger, (9) p. 277, pl. iii, fig. 2, and (10) p. 247, pl. viii, fig. 2. *H. (P.) alliaria*, Miller, includes *H. alliacea*, Jeffr., *H. nitens*, Shepp., *H. fetida*, Stark, and *H. remota*, Bens.; Tryon, (2) p. 145. *H. (P.) lucida*, Drap.,

includes *H. draparnaldi*, Beck, *H. nitida*, Drap., *H. cellaria*, Desh., and *H. nitens*, Alten; *id. t. c.* p. 149. *H. (Vitrea) subeffusa*, Bttg., n. var. *daghestana*; Boettger, (7) p. 133. Description and figures of radula; Dybowski (1)

Limax cephalonicus, n. sp., Cephalonia, Simroth, (2) p. 329, pl. x, fig. 15. *L. cinereus* from Madeira, = *L. maximus*, on basis of anatomy; Simroth, (1) p. 25. *L. armeniacus*, n. sp., Armenia, *id. t. c.* p. 27, pl. i, figs. 4-7. *L. tenellus* from Grimming, Styria; *id.* (7) p. 76. Description and figures of radula; Dybowski (1). *L. (Lehmannia) tigris*, *L. talyschanus*, n. spp., Talysch Mts., Boettger, (9) p. 269, pl. ii, figs. 2-5, and (10) pp. 243 & 245; for anatomy see Simroth, (2) p. 327.

Lytopenelle, n. sect. *Amalie*: "Differt ab. *A. typicis* clypeo magis recedente, latiore, magis soluto, antice duabus partibus e tribus liberis, ad latera liberrimo, postice non emarginato, superne plano, sulcis impressis non signato. Orificium genitale secundum tentaculum majorem dextrum situm"; for *A. longicollis*, n. sp., Talysch Mts.; Boettger, (9) p. 266, pl. ii, fig. 1, and (10) p. 242.

Macrochlamys pedisequæ, n. sp., Talifoo, Heude, (1) p. 212.

Microcystis kalielleformis, n. sp., in amber; Klebs, (2) pp. 379-382, pl. xvii, fig. 4.

Nanina includes as subgg., *Ariophanta*, *Celatura*, *Rotula*, *Rhysota*, *Orpiella*, *Xesta*, *Sessara*, *Guillainia*; Tryon, (2) p. 5. *N. inversicolor*, Fér., includes *N. bicolor*, *N. mauritiana*, Lmk., *N. puerocunæ*, Fér., and *N. plebeja*, Mus. Berol.; *id. t. c.* p. 24. *N. unidentata*, Chem., includes *N. microdonta*, Desh., *N. ventricosa*, Jan., *N. uniplicata*, Mörch, and (?) *N. militaris*, Pffr.; *id. t. c.* p. 26. *N. mackenziana*, Soul., = *Ariophanta janus*; *N. amphidroma*, v. Marts., = *N. martini*, Pffr.: *id. t. c.* p. 33. *N. blainvilleana*, Lea, has priority over *L. semigranosa*, Sow.; *id. t. c.* p. 44. *N. juliana*, Gray, includes *N. rosacea*, Sow., *N. dufourii*, Grat., *N. citrinoides*, Grat., and *N. commendabilis*, Fér.; *id. t. c.* p. 70. *N. solata*, Benson, includes *N. menkeana* and *N. soluta*, Rv.; *id. t. c.* p. 80. *N. (?) indurata*, n. sp., Tchenkiu; Heude, (1) p. 212. *N. limbifera* n. var. *bangaiensis*, Celebes; v. Martens (3). *N. fuchsiana*, Heude, referred to *Rhysota*; Möllendorff, (2) p. 181: note on; Gredler, (1) p. 15. *N. atropos*, n. sp., Geelvink Bay, Tapparone-Canefri, p. 147.

Parmacella succini, n. sp., in amber; Klebs, (2) pp. 369-373, pl. xvii, fig. 1. Note on species from Gibraltar, with anatomy; Cockerell, T. D. A. (3).

Pristina, n. subg. for *Hyalina stearnsi*, Bland., and *H. lansingi*, Bland.; Ancey (10): name preocc., *Anceyia* suggested instead; Pilsbry (Conch. Exch. i, p. 26), which again is preocc. by Bourguignat, 1885 [see Zool. Rec. xxii, Moll. p. 68.]

Sitala carinigera, Ramoi, *S. propinqua*, Arfak Mts., n. spp., Tapparone-Canefri, pp. 40 & 41, pl. i, figs. 10, 11, 6, & 7.

Thyrophorella, Greef, is able to close its shell by bending down the flexible margin; it has a radula with small tridentate median tooth, and lateral teeth with external accessory teeth, directed at first towards the base, then upwards (formula 54.1.54); the shell is sinistral, translucent, white, smooth, flattened above, arched below, and with a wide umbilicus; v. Martens (1).

Vitrinidæ : palæarctic species defined by Westerlund, (1) pp. 14-82.

Vitrina : description and figs. of radula ; Dybowski (1). Anatomy of so-called "dart" of female glandular organs, with remarks on phylogeny ; Wiegmann. *V. excisa*, n. sp., Galicia, Westerlund, (1) p. 18. *V. (Trochovitrina) subcarinata* figured ; Bøttger, (9) p. 275, pl. iii, fig. 1, & (10) p. 247, pl. viii, fig. 1.

Zonitidæ are treated monographically by Tryon (2) ; the family contains the genera *Nanina*, *Zonites*, *Selenites*, and *Charopa*, which are subdivided into subgenera and sections.

Zonites includes the following subgg. :—*Zonites*, *Hyalinia*, *Phacussa*, *Stenopus*, *Omphalina*, *Gastrodonta*, *Striatura*, *Janulus* ; *id. t. c.* p. 10. *Z. cultellatus*, Thoms., California, is probably *Z. albanicus*, Zgl., accidentally imported ; *id. t. c.* p. 135. *Z. harlei*, *Z. arabia*, n. spp., Catalonia, Fagot, (2) pp. 173 & 174. *Z. scrobiculatus*, is not a *Helicarion*, as supposed by v. Möllendorff ; Gredler, (1) p. 18.

HELICIDÆ.

Angrandiella, n. subg. for *Helix angrandi*, Morelet ; Ancy (10).

Arion : Description and figures of radula ; Dybowski (1). *A. euthymeanus*, n. sp., Le Luc, Florence. *A. minimus* distinct from *A. flavus*, Nilss. ; *A. fuscus*, Müller, = *A. subfuscus*, Drap. ; Simroth, (1) p. 19. *A. hispanicus*, n. sp., Portugal, *id. t. c.* p. 21, pl. i, fig. 2. *A. nivalis*, Koch, separate from *A. empiricorum* ; *id.* (7) p. 77. *A. subfuscus*, notes on ; Cockerell (9).

Bulinus (Amphidromus) begini, n. sp., Cambodgia, Morlet, (2) p. 75. *B. humbloti*, n. sp., Madagascar, Mabille, (1) p. 127. *B. herculeus*, n. sp., Madagascar, *id. t. c.* p. 182.

Cochlostyla cossmanniana, n. sp., Philippines, Crosse (4). *C. quadrasi*, *C. graellsii*, n. spp., Philippines, Hidalgo, (3) pp. 154 & 155, pl. viii, figs. 3 & 5.

Cælospira, n. subg. for *Helix mac-neili*, Crosse ; Ancy, (10) [*nom. præocc.*]

Coliolus, n. sect. *Helix*, for *H. (C.) arfakiensis*, n. sp., Arfak Mts. Tapparone-Canefri, p. 131, pl. i, fig. 21.

Geomalcus, for anatomy see p. 28, *antea*.

Helix : description and figures of radula ; Dybowski (1).

Helix. European species :—

Helix idiophya, n. sp., Le Luc, Florence. *H. striata*, Müll., and the allied *H. costulata*, Zgl., and *H. vicianica*, Bgt., with varieties, discussed by Locard (2). *H. strucki*, n. sp., Algarve, Portugal, Maltzan (1). *H. ripacurcica*, n. sp., Catalonia, Bofill, p. 151. *H. bofilliana*, *H. carascalopsis*, *H. salaunica*, *H. monistrolensis*, n. spp., Catalonia, Fagot, (2) pp. 177-183. *H. planospira* n. var. *occultata*, p. 20, pl. i, fig. 4. *H. argentatrolæ*, p. 22, pl. i, fig. 5, *H. forsythi*, p. 23, pl. ii, fig. 1, and n. var. *orta*, *H. saxetana*, p. 25, pl. ii, fig. 3, n. spp., Monte Argentaro ; Paulucci. *H. variata*, *H. salemitana*, n. spp., Sicily, Pini, p. 166 & 167. *H. soccaliana*, n. sp., Corfu, Letourneux. *H. nemoralis* varr., from near Dublin, Redding. *H. (Campylæa) walteri*, n. sp., near *H. hoffmanni*, Rossm., Dalmatia ; Bøttger, (5) p. 37, pl. ii, fig. 1. *H. (Carthusiana) haussknechti*, *H.*

(*Campylæa*) *rindica*, H. (*C.*) *choristochila*, n. spp., Thessaly, *id.* (6) pp. 53-55, pl. ii. H. (*Ena*) *bœtgeri*, Cless., n. var. *connivens*, Caucasus; *id.* (7) p. 144, fig. 2. H. (*Fruticicola*) *strigella*, Drap., n. var. *moldavie*; Clessin, (1) p. 165. H. (*Fruticocampylæa*) *phœolema*, n. sp., Caucasus, Bœtger, (7) p. 137, fig. 4. H. (*Iberus*) *bülowi*, H. (*I.*) *rollei*, Sicily, n. spp., H. (*I.*) *sardonis* var. *dorgaliensis*, H. (*I.*) *ridens*, n. var. *splendens*, *minor*, Sardinia; Maltzan (2). H. (*Jacosta*) *milaschewitschi*, n. sp., Crimea, Retowski (1). H. (*Pomatia*) *mazzulii*, Jan., Lampedusa; Reinhardt (1). H. (*Tacheocampylæa*) *melonii*, n. sp., H. (*T.*) *carotii*, 5 n. var., Sardinia; Maltzan (2). H. (*Trichia*) *vagienna*, n. sp., Piedmont, Pollonera (2). H. (*T.*) *densecostulata*, n. sp., Crimea, Retowski, (2) p. 23, pl. i, fig. 13. H. (*Xerophila*) *montandoni*, n. sp., Dobrudscha, Clessin, (1) p. 51. H. (*X.*) *obvia*, Zgl., n. var. *dobrudschæ*, with notes on synonymy of the species; *id. t. c. p.* 52. H. (*X.*) *nummuliformis*, n. sp., Crimea, Retowski, (2) p. 25, pl. i, fig. 7.

Helix. Asiatic species:—

Helix dorri, H. *hueensis*, n. spp., Hué, Cochinchina, Wattebled, pp. 56 & 57, pl. iv, figs. 2 & 3. H. *fouresi*, n. sp., Cambodgia, Morlet, (2) p. 74. H. *jourdyi*, n. sp., Tonkin, *id.* (3) p. 75, and (4) p. 258, pl. xii, fig. 3. H. *balansai*, n. sp., Tonkin, *id.* (4) pp. 269 & 270, pl. xii, fig. 4. H. *initialis*, Heude, notes on; Gredler, (1) p. 15. H. *piligera*, Gredl., = *H. submissa*, Desh.; *id. t. c. p.* 17. H. *franciscanorum*, n. sp., Hunan, *id.* (2) p. 2. H. *hupeana*, H. *doliolum*, n. spp., Hupé, *id. t. c. pp.* 5 & 6. H. *pinchoniana*, Chen-tu-fu, H. *buzina*, H. *mellita*, H. *mellitula*, H. *permellitula*, H. *samara*, Ta-li-fu, H. *orthocheilis*, H. *bicallosula*, Chenkiu, n. spp., Heude, (1) pp. 213-215. H. *tabuensis*, n. n. for *H. patruelis*, Ad. nec Angas; Ancy (5). H. (*Acanthinula*) *harpula*, n. sp., Tokio, Reinhardt (3). H. (*Carthusiana*) *pisiformis*, Pffr., redescribed and figured; Bœtger, (9) p. 286, pl. iii, fig. 4, and (10) p. 248, pl. viii, fig. 4. H. (*Ohloritis*) *maforensis*, n. sp., Geelvink Bay, Tapparone-Canefri, p. 130, pl. i, figs. 1-3. H. (*Fruticotrochus*) *trochacea*, n. sp., Hunan, Gredler, (1) p. 6. H. (*Geotrochus*) *gorenduensis*, H. (*G.*) *maclayiana*, n. spp., New Guinea, Brazier, (2) p. 841. H. (*Gonostoma*) *binodata*, n. sp., Hubei, Möllendorff, (2) p. 191, pl. vi, fig. 4. H. (*Helicogena*) *raddei*, n. sp., Talsch Mts., Bœtger, (9) p. 295, pl. ii, fig. 6, and (10) p. 249. H. (*H.*) *lucorum*, Müll. var. *euphratica*, v. Marts., remarks and figure; *id.* (7) p. 141, fig. 6. H. (*Obba*) *linnaeana*, Pffr., is not a *Nanina*, hab. Philippines; Ancy (6). H. (*Papuina*) *rhynchonella*, H. (*P.*) *leonardi*, n. spp., Geelvink Bay, Tapparone-Canefri, pp. 134 & 25. H. (*Plectopylis*) *schlumbergeri*, n. sp., Tonkin, Morlet, (4) pp. 259 & 272, pl. xii, fig. 2. H. (*Plectotropis*) *gerluchi*, Mart., n. var. *huanicola*; Gredler, (2) p. 3. H. (*Polygyra*) *hensaniensis*, n. sp., Hunan, *id.* (1) p. 4. H. (*Rhysota*) *achilles*, n. sp., New Guinea, Brazier, (2) p. 842. H. (*Satsuma*) *microtrochus*, n. sp., Guichew, Möllendorff, (2) p. 195, pl. vi, fig. 6. H. (*Sulcobasis*) *gerrardi*, n. var. *obtecta*, New Guinea; Reinhardt, (2) p. 59.

Helix. African species:—

Helix pyramidata, 11 mm. high, in Algeria; Kobelt, (1) p. 39. H. *vermiculata*, Müll., n. var. *uticensis*, Carthage; *id.* (1) p. 100. H. *hamudæ*,

n. sp., Porto Farina, N. Africa; *id. t. c.* p. 101. *H. fleurati*, Bourg., found in various colours; *id. t. c.* p. 106. *H. duroi*, n. sp., Morocco, Hidalgo, (2) pp. 152 & 153, pl. viii, fig. 1. *H. usurpans*, n. n., = *H. torrefacta*, Lowe (*nec* Adams), and *H. lowei*, Wollaston (*nec* Fér.); Furtado (1). *H. galactostomella*, *H. gaudens*, *H. campelica*, *H. paropta*, *H. subfunnebris*, *H. gaudiella*, n. spp., Madagascar, Mabilie, (1) pp. 124-127. *H. (Dorcasia) alexandri*, Pffr., n. var. *minor*, Kalahari Desert; Boettger, (11) p. 22, pl. ii, fig. 1.

Helix. American species:—

Helix (Hemitrochus) filicosta, Pffr., Bahamas; Ancey (6).

Mabiliella, n. g. for *Bul. notabilis*, Smith; *id.* (2).

Nothus simpsoni, *N. fordiana*, n. spp., *N. mexicanus*, Pffr., redescribed, Honduras, *id.* (9) pp. 245-249. [Generic name twice preocc.—REC.]

Patula leptotera, *P. rigophila*, n. spp., Orange Bay, S. America; Mabilie, (1) pp. 123 & 124.

Plectopylis schistoptychia, n. sp., Hunan, Möllendorff, (2) p. 185, pl. vi, fig. 2: also a scheme of the Chinese species of the genus, p. 189.

Pacilostola, n. subg. for *Helix farrisi*, Pffr.; Ancey (10). [Generic name thrice preocc.—REC.]

Polygyrella polygyrella, Bland, shell and genital organs figured; Binney, p. 36, pls. i, figs. 12 & 14, & iii, fig. 8 (wrong ref. in text).

Punctum lederi figured; Boettger, (9) p. 283, pl. iii, fig. 3, and (10) p. 248, pl. viii, fig. 3.

Satsuma, Adams, preferred to *Fruticetrochus*, Kobelt, as it has priority, and the latter is a *vox hybrida*; Möllendorff, (2) p. 194.

Strobilus gedanensis, n. sp., in amber; Klebs, (2) pp. 374-379, pl. xvii, fig. 3.

Triodopsis sanburni, *T. harfordiana*, *T. hemphilli*, n. spp., Idaho, Binney, pp. 37 & 38, figs.

Trochomorpha (Nigritella) morio, n. sp., Geelvink Bay, Tapparone-Canefri, p. 126, pl. i, figs. 8 & 9.

Leucochroidæ: palaearctic species defined by Westerlund, (1) pp. 82-88.

BULIMULIDÆ.

Bulimulus jonasi, Pffr., n. var. *stolli*, Guatemala, *B. interpunctus*, n. sp., Brazil; Martens (5).

Partula rufa, Lesson, figured and compared with *P. guamensis*, Pffr.; *P. similaris*, *P. woodlarkiana*, Woodlark I., New Guinea, *P. perlucens*, *P. incurvum*, *P. regularis*, *P. minor*, *P. corneola*, *P. coxii*, *P. hastula*, Solomon Is., *P. eburnea*, hab.?, *P. proxima*, *P. pyramis*, *P. eximia*, New Hebrides, *P. newcombianum*, Philippines, *P. (Diplomorpha) de la touri*, Santo Espirito Is., n. spp., described and figured; also figures given of *P. concinna*, *P. pellucida*, *P. layardii*; Hartmann.

Peltella palliolum, Fér., has been dissected and the genus redefined: it is stated to be "a slug closely related to *Bulimulus*, even if it be not a *Bulimulus* directly modified by retrograde metamorphosis"; Jhering (1).

Placostylus savesi, n. sp., New Caledonia; Crosse (6).

CYLINDRELLIDÆ.

Cylindrella bourguignatiana, n. sp., Honduras; Ancey, (9) p. 243.
C. (Gongylostoma) pulchella, n. sp., Guatemala; Martens, (5).

PUPIDÆ.

Balea antiqua, n. sp., in amber; Klebs, (2) pp. 388 & 389, pl. xvii, fig. 7.

Buliminus dubius, n. sp., Crimea; Retowski, (2) p. 33, pl. i, fig. 11.
B. herzensteini, *B. trigonochilus*, Turkestan, *B. kuschakewitzi*, Ferghana, *B. bonvallotianus*, Kokhand, *B. ufjalvyanus*, *B. potaninianus*, *B. martenisianus* (n. n. = *B. segregatus*, var. *minor*, v. Marts.), Turkestan; Ancey (3, 7). *B. przewalskii*, Ferghana, *B. subobscurus*, *B. aptychus*, Wjernoe, Semiretschinsk, *B. leucoptychus*, Riv. Fekkes; *id.* (8). *B. hunancola*, Gredl., note on; Gredler, (1) p. 15. *B. (Chondrula) tridens*, Müll., var. *mareida*, figured; Bøttger, (10) p. 251, pl. viii, fig. 6. *B. (C.) didymodus* figured; *id.* (9) p. 299, pl. iii, fig. 7, and (10) p. 252, pl. viii, fig. 7. *B. (Ena) talyschanus* figured; *id.* (9) p. 297, pl. iii, fig. 5, and (10) p. 251, pl. viii, fig. 5. *B. (Mastus) psammophilus*, *B. (Leucochiloides) calaharicus*, n. spp., Kalahari Desert; *id.*, (11) pp. 23–25, pl. ii, figs. 2 & 3. *B. (Petraeus) ponticus*, n. sp., Crimea; Retowski, (2) p. 28, pl. i, fig. 9. *B. (Zebrina?) crassus*, n. sp. Crimea; *id. t. c.* p. 26, pl. i, fig. 6.

Charadrobis superstructa, Mouss., n. var. *unibasalis*, Svanetia; Bøttger, (7) p. 149, fig. 5.

Clausilia, additional list of palaearctic forms; Westerlund, (3) pp. 1–6.

Clausilia queyrasiana, *C. hypochra*, *C. jurensis*, *C. provincialis*, *C. andusiensis*, n. spp., France; Coutagne. *C. catalonica*, *C. clavorsiana*, n. spp., Catalonia; Fagot, (2) pp. 184–188. *C. itala* distinguished from *C. balsamoi*; Gredler, (3) p. 140. *C. dubia*, Drap., subsp. *grimmeri* (Parr.), A. Schm., n. var. *floiringiana*, Styria; Tschapek. *C. inversa*, *C. infecta*, *C. margaritacea*, *C. vulpina*, *C. succinea*, *C. labrosa*, *C. indurata*, *C. bucinella*, *C. constellata*, Chen-kew, *C. succinea*, *C. siderea*, *C. binaria*, *C. clavulus*, *C. cylindrella*, Tali-fu, *C. aprivora*, Patong, n. spp.; Heude, (1) pp. 296–302. *C. polygyra*, Bøttger, *hab.*, not Carthage, but Jebel Zaghuani; Kobelt, (1) p. 45. *C. (Albinaria) haussknechti*, n. sp., *C. (Papillifera) clandestina*, Rossm., n. var. *trisuturalis*, *C. (P.) saxicola*, P., n. var. *thessala*, Thessaly; Bøttger, (6) pp. 60, 61, pl. ii, fig. 2. *C. (Euxina) subaggesta*, *C. (E.) pontica*, *C. (E.) lævestriata*, n. spp., Crimea; Retowski, (2) pp. 37–40, pl. i, figs. 4, 5, & 2. *C. (Hemiphaedusa) gastroptychia*, Möll., note on; Gredler, (1) p. 19. *C. Lopedusæ Calcara*, Lampedusa; Reinhardt (1). *C. (Oligoptychia) amatia*, n. sp., Mt. Taurus, resembling *C. bicristata*, Rossm., from Parnassus; Bøttger (2). *C. (O.) gustavi* figured; *id.*, (9) pl. iii, fig. 9, and (10) p. 254, pl. viii, fig. 9. *C. (Pseudonemia) pallidocincta*, *C. (P.) breviplica*, n. spp., Hunan & Hubei; Möllendorff, (2) pp. 198 & 199, pl. vi, fig. 7.

Celocentrum clathratum, n. sp., Guatemala; Martens (5).

Electrea, n. g. "Testa dextrosa, vix rimata, ovati-conica, irregulariter tenuiter striata et sub lente striis spiralibus confertis sculpta; spira sub-inflato conica in conum obtusulum desinens; sutura lævis; anfr. 5, convexiusculi, ultimus $\frac{5}{2}$ longitudinis vix superans; apertura sub-circularis, basi axim subexcedens; perist. reflexiusculum simplex, margine breviter dilatato et reflexiusculo." For *E. kowalewskii*, n. sp., in amber; Klebs, (2) pp. 389-393, pl. xvii, fig. 8.

Fauxulus, n. n. for *Faula*, Ad. (nom. præocc.); Ancy (5).

Hypselostoma crossei, n. sp., Tonking; Morlet, (4) pp. 259 & 275, pl. xii, fig. 5.

Microstele, n. sect. for *Pupa noltei*, n. sp., Kalahari Desert; Boettger, (11) p. 25, pl. ii, fig. 4.

Pagodina pagodula (Desm.), n. var. *lederi*, Talysch Mts; *id.* (9) p. 305, pl. iii, fig. 8, and (10) p. 253, pl. viii, fig. 8.

Pupa bofilli, *P. montserratica*, n. spp., Catalonia, Fagot, (2) pp. 189-192. *P. liliensis*, *P. catalonica*, *P. pulchella*, *P. derotensis*, n. spp., Catalonia, Boffill. *P. moraguesi*, n. sp., Majorca, Moragues. *P. substriata*, Harz; Goldfuss (2). *P. angulina*, n. sp., China, Gredler, (1) p. 7. *P. hebes*, Ancy, = *P. arizonensis*, Gabb, figured; Binney, p. 40, pl. iii, fig. 10.

Vertigo hauchecornei, *V. künowii*, n. spp., in amber, Klebs, (2) pp. 382-387, pl. xvii, figs. 5 & 6.

STENOGYRIDÆ.

Achatina capelloi, *A. ivensi*, n. spp., Quintum and hab.?, Africa, Furtado, (4) pp. 143-146, pls. vii, fig. 2, & vi, fig. 2.

Azeca etrusca, n. sp., Mt. Argentaro, Paulucci, p. 36, pl. ii, fig. 5.

Cæcilianella binodosa, n. sp., Algarve, Portugal, Maltzan (1).

Cionella acicula in a vineyard near the Rhine; Goldfuss (2).

Ferussacia gravida, n. sp., Le Luc, Florence.

Geostilba blandiana, Crosse, redescribed and figured; Crosse (3).

Limicolaria bellamyi, *L. hyadesi*, n. spp., Upper Senegal, Jousseau, pp. 475-478, pl. xii, figs. 1 & 2.

Rhaphidiella, n. subg. for *Cæcilianella barbozae*, n. sp., Algarve, Portugal; Maltzan (1).

Stenogyra fuchsiana, Heude, is *Spiraxis mira*, Gredl.; Möllendorff, (1) p. 105. *S. pachygyra*, n. sp., Hunan, Gredler, (1) p. 9. *S. arctispiralis*, n. n. for *S. arctispira*, Gredl., nec v. Marts.; *id. t. c.* p. 17.

Terebrella, n. subg. for *Cæcilianella clessini*, n. sp., Algarve, Portugal, Maltzan (1).

SUCCINEIDÆ.

Succinea: description and figures of radula; Dybowski (1). *S. bofilli*, n. sp., Catalonia, Fagot, (2) p. 171. 3 additional palæarctic forms; Westerlund, [3] p. 6.

ONCHIDIIDÆ.

Onchidium chameleon, n. sp., Port Jackson, Brazier (1) ; see also v. Lendenfeld, pp. 16 & 38, *antea*.

BASOMMATOPHORA.

GEHYDROPHILA.

AURICULIDÆ.

Carychium lederi figured ; Boettger, (9) p. 320, pl. iii, fig. 10, and (10) p. 255, pl. viii, fig. 10.

Pythia proxima, n. sp., West New Guinea, Tapparone-Canefri, p. 158, pl. i, fig. 13. *P. latidentata*, n. sp., Katan, *id.* p. 100, pl. i, figs. 14 & 15. *P. obscura*, n. sp., Geelvink Bay, p. 162, pl. i, fig. 12.

HYGROPHILA.

LIMNÆIDÆ.

Amphipeplea, continued by Clessin (3). *A. queenslandica*, n. sp., Queensland, p. 405, pl. liii, fig. 2.

Gyraulus polaris, n. sp., N. of Norway, Esmark & Hoyer, pp. 115 & 116.

Limnæa. Clessin's (3) Monograph completed, 145 species being recorded, of which the following are new: *L. chefouensis*, Cheefoo, p. 391, pl. lv, fig. 6 ; *L. heudei*, China, p. 394, pl. lv, fig. 10 ; *L. möllendorffianus*, Chusan, China, *ibid.* pl. lv, fig. 5 ; *L. mighelsianus*, n. n., = *L. ampla*, Migh., p. 401. 6 additional palæarctic species ; Westerlund, (3) pp. 7-9. *L. annamitica*, n. sp., Hué, Cochin China ; Wattebled, p. 57, pl. iv, fig. 4. *L. auricularia* n. var. *coreana*, Corea ; Martens (2). *L. moeris*, n. sp., Egypt, *id.* (4) p. 126. *L. contracta*, Currier, n. sp., Michigan, DeCamp, p. 14, pl. i, fig. 1. *L. palustris* n. varr. : Cockerell, S. (3) ; Sterki, p. 19. *L. (Gulnaria) truncatulus* (Müll.) n. var. *labiata*, Talysch Mts. ; Boettger, (10) p. 256.

Planorbis. 16 additional palæarctic forms ; Westerlund, (3) pp. 9-12. Monographic revision of Yorkshire forms ; Nelson & Taylor. *P. (Hippentis) distinctus*, n. sp., Hunan, Gredler, (2) pp. 15-17. *P. præcursor*, Cossmann, 1883, = *Valvata leopoldi*, Boissy ; Cossmann. *P. subangulatus*, remarks on some statements by Cockerell regarding ; Smith (1). Erosion of shells of ; Shrubsole.

PHYSIDÆ.

Physidæ of Mexico treated, and many figured, by Fischer & Crosse ; n. spp. previously defined.

Physa. Clessin's (3) Monograph of this genus is completed ; 267 (No. 263 is repeated) species are recorded, of which the following are new: — *P. novo-guineæ*, New Guinea, p. 335, pl. xlvii, fig. 3 ; *P. moderata*, Tahiti, p. 338, pl. xlvii, fig. 12 ; *P. peasei*, Sandwich Is., p. 339,

pl. xlvii, fig. 8; *P. nitidula*, Honduras, *ibid.*, pl. xlvii, fig. 9; *P. moreletiana*, p. 341, pl. xlviii, fig. 3; *P. naticoides*, *ibid.*, pl. xlviii, fig. 5; *P. sandwichensis*, Sandwich Is., p. 342, pl. xlviii, fig. 7; *P. lacustris*, Central America, p. 344, pl. xlviii, fig. 9; *P. albertisi*, New Guinea, p. 347, pl. xlix, fig. 2; *P. semperi*, Philippines, p. 348, pl. xlix, fig. 6; *P. rohlfsi*, Central Africa (L. Chad), p. 349, pl. xlix, fig. 6; *P. polakowskii*, Guatemala, p. 352, pl. xlix, fig. 12; *P. tortuosa*, p. 360, pl. li, fig. 1; *P. conica*, *ibid.*, pl. li, fig. 3; *P. multispinata*, p. 361, pl. li, fig. 4; *P. waterhousei*, p. 361, pl. li, fig. 6, S. Australia; *P. zanzebarica*, Zanzibar, p. 362, pl. li, fig. 5; *P. aschersoni*, N. Africa, p. 362, pl. li, fig. 2; *P. lincolnensis*, Port Lincoln, Australia, p. 363, pl. li, fig. 7; *P. flavida*, Sandwich Is., p. 364, pl. li, fig. 9; *P. cingulata*, S. Australia, *ibid.*, pl. li, fig. 8; *P. mozambiquensis*, Mozambique, p. 366, pl. liv, fig. 1; *P. chilensis*, Chili, p. 369, pl. liv, fig. 3; *P. contortula*, Australia, p. 369, pl. liv, fig. 6; *P. krefftii*, New South Wales, p. 370, pl. liv, fig. 12; *P. hartmanni*, Hawaii, p. 371, pl. liv, fig. 9; *P. tennisoni*, p. 371, pl. lii, fig. 11; *P. novæ-zealandiæ*, p. 372, pl. liv, fig. 7, New Zealand; *P. küsteri*, n. n., = *P. sp.*, p. 409, pl. iii, figs. 1-3; *P. canefriana*, n. n., = *P. tapparoniana*, Cless., p. 410. *P. parkeri*, Currier, n. sp., Michigan, DeCamp, p. 15, pl. i, fig. 3. *P. craveni*, n. n. for *P. lirata*, Craven (*nec* Tristram); *P. binneyana*, n. n. for *P. diaphana*, Tryon (*nec* Kr.); *P. carinifera*, n. n. for *P. scalaris*, Jay (*nec* Dunker); Ancey (5). *P. hypnorum*, n. var. *cuprella*, Rowe, p. 56.

THALASSOPHILA.

Thalassophila of Mexico; Fischer & Crosse, p. 107.

OPISTHOBRANCHIATA.

NUDIBRANCHIATA.

43 species of different families are recorded from Liverpool Bay by Herdman (1).

KLADOHEPATICA.

HERMÆIDÆ.

Lafontia, n. g. for *Actæonia senestra*, de Quatrefages, and *A. corrugata*, Ald. & Hanc., *Actæonia* being liable to confusion with *Actæon*, Mont.; Locard, (1) pp. 88 & 532.

ÆOLIDIADÆ.

Chlamylla, n. g. "Corpus elongatum, brevicaudatum; limbo dorsali lato prominenti papillis elongato conicis caducis oblecto; tentacula elongata; rhinophoria elongata non perfoliata; podarium sat latum antice angulis productis. Mandibulæ validæ, margine masticatorio non denticulato. Radula dentibus triseriatis; dentes laterales vix denticulati. Prostata elongata; penis non armatus." For *C. borealis*, n. sp., Arctic Ocean; Bergh, (3) pp. 9-13, pl. i, figs. 9-22.

Coryphella salmonacea (Couth.), *C. landsburgii*, Ald. & Hanc., anatomical details; *id. t. c.* pp. 5-9, pl. i, figs. 1-4.

Galvina farrani, Ald. & Hanc., Vardö, farthest north locality; *id. t. c.* p. 3.

Goniolis typica, M. Sars, anatomy; *id. t. c.* pp. 14-18, pl. iii, figs. 1-26.

Govia, anatomy, see Trinchese.

DENDRONOTIDÆ.

Campaspe major, n. sp., Vardö, Bergh, (3) pp. 21-24, pl. i, figs. 23-26, pl. ii, figs. 1-11.

Dendronotus arborescens (O. F. Müll.), anatomy; *id. t. c.* pp. 25-33, pl. ii, figs. 12-28. *D. lacteus*, radula figured; Becher.

TRITONIADÆ.

Sphærostoma, Macgill., preferred to *Tritonia*, Cuv.; Locard, (1) pp. 39 & 531.

PLEUROPHYLLIDIADÆ.

Pleurophyllidia mülleri, n. sp., Brazilian coast, Jhering, (2) p. 223, pl. ix, fig. 1.

HOLOHEPATICA.

DORIDIDÆ.

Aporodoris, n. g. for *Doris millegrana*, Ald. & Hanc.; Jhering, (2) p. 238, pl. ix, fig. 3.

Chromodoris amœna, n. sp., New Zealand, Cheeseman.

Etidoris, n. g. "Corpus sat molle subdepressum. Dorsum tuberculatum et granulosum. Tentacula affixa, plicæformia. Branchia retractilia e foliis tripinatis formata. Podarium sat latum, margine anteriore superficialiter sulcatum, lacio superiore non fisso. Armatura labralis nulla. Radula rhachide lamella humili, pleuris multidentatis; dentes hamati, externi denticulati vel pectiniformes. Ventriculus liber. Penis inermis." For *E. ladislavii*, n. sp., Brazilian coast; Jhering, (2) p. 234, pl. ix, fig. 2.

Staurodoris januarii, Bgh., = *S. verrucosa* (Cuv.); *id. t. c.* p. 230.

TECTIBRANCHIATA.

TORNATINIDÆ.

Tornatina olivæformis, Issel, = *T. fusiformis*, A. Ad.; Cooke, (2) p. 129. *T. inconspicua*, H. Ad., = *T. planospira*, A. Ad.; *id. t. c.* p. 130.

SCAPHANDRIDÆ.

Amphisphyræ sequenzæ, n. sp., Pernambuco (= *Bullina undata*, Seg.); Watson, p. 646, pl. xlviii, fig. 5.

Atys chrenbergi, Issel, = *A. semistriata*, Pease; *A. isseli*, H. Ad., = *Haminea curta*, A. Ad.; *A. cylindrica*, Helb. = *A. succisa*, Ehr., = *A. angustata*, E. A. Sm.; Cooke, (2) pp. 131 & 132.

Cylichna elongata, *C. truncatella*, n. spp., French coast, Locard, (1) pp. 71 & 533.

Diaphanna nivea, n. sp., Tasmania, Petterd.

BULLIDÆ.

Acera elegans, n. sp., France, Locard, (1) pp. 79 & 535.

Haminea vitrea, A. Ad., = *H. tenera*, A. Ad.; *H. æquistriata*, Smith, = *H. curta*, A. Ad., = *Atys isseli*, H. Ad.; Cooke, (2) pp. 130 & 131.

CORAMBIADÆ.

Corambe batava, n. sp., Holland, Kerbert.

PROSOBRANCHIATA.

PECTINIBRANCHIATA.

TOXOGLOSSA.

TEREBRIDÆ.

Terebra (Myurella) mamillata, n. sp., Philippines, Watson, p. 381, pl. xvi, fig. 1.

CONIDÆ.

Bela: 40 species enumerated with figures by Kobelt (12). *B. rugulata*, Trosch., and 3 new varieties described and figured; Friele, pp. 3 & 4, pls. vii & ix. *B. schmidtii*, n. n. for *Mangelia* ? *plicifera*, Schm.; *id. op. cit.* p. 10. *B. koreni*, n. sp., North Sea. *id. op. cit.* p. 19, pl. viii, fig. 23. *B. sculpturata*, n. sp., Bering Sea, Dall, (3) p. 299, pl. iv, fig. 7. *B. alaskensis*, *B. laevigata*, *B. albrechti*, *B. harpa*, *B. krausei*, and *B. solida*, figured; *id. t. c.* pls. iii & iv.

Clathurella, Carpenter, preferred to *Defrancia*, Millet; Watson, p. 348. *C. cala*, *C. homæotata*, *C. phyxanor*, Atlantic, *C. porcellana*, Pernambuco, n. spp., *id. t. c.* pp. 361-365, pl. xxvi, figs. 11, 12, 14 & 13. *C. bucquoyi*, n. sp., = *Defrancia purpurea* var. *oblonga*, Jeffr.; Locard, (1) pp. 113 & 544. *C. dollfusi*, n. sp., = *Mangelia purpurea* var. *asperrima*, F. & H., France; *id. t. c.* pp. 115 & 545.

Columbarium spinicinctum, Martens, figured by Kobelt, (12) p. 172, pl. xxxiv, figs. 1 & 2.

Mangilia ephamilla, n. sp., 14-48 faths., Bush, (2) p. 580 : *M. melanitica*, Dall, n. var. *oxia* ; *ead. ibid.* : *M. oxytata*, *M.* (?) *glypta*, n. spp., 48 faths., *ead. t. c.* p. 582 : all from Cape Hatteras. *M.* (?) *aleutica*, Dall, figured ; Dall, (3) pl. iii, fig. 6.

Pleurotoma: 18 species recorded, with descriptions and figures ; Kobelt, (12) pp. 173-184, pls. xxxiv-xxxvi. *P. xanthophaës*, Port Jackson, *P. phymatias*, Philippines, n. spp., Watson, pp. 282 & 283, pl. xxvi, figs. 1 & 2. *P. (Surcula) dissimilis*, n. sp., Philippines, *id. t. c.* p. 298, pl. xxvi, fig. 3. *P. (Drillia) spadix*, n. sp., Port Jackson, *id. t. c.* p. 310, pl. xxvi, fig. 6. *P. (Bela) climakis*, n. sp., Mid-Atlantic, *id. t. c.* p. 315, pl. xxvi, fig. 7. *P. (Spirotropis) aganactica*, n. sp., Mid-Atlantic, *id. t. c.* p. 323, pl. xxvi, fig. 8. *P. (Thesbia) membranacea*, *P. (T.) xanthius*, n. spp., New Zealand, *id. t. c.* pp. 333 & 334, pl. xxvi, figs. 9 & 10. *P. rousi*, *P. bairstowi*, n. spp., Port Elizabeth, Sowerby, (2) p. 6.

Raphitoma amœna, G. O. Sars, referred to *Defrancia*, and teeth figured ; Friele, p. 23, pl. x, fig. 22. *R. rissoi*, n. n. for *Mangelia costulata*, Risso ; Locard, (1) pp. 120 & 548.

Spirotropis carinata (Phil.) figured by Kobelt, (12) p. 170, pl. xxxiii, fig. 11.

Taranis, 2 species figured ; *id. t. c.* p. 168, pl. xxxiii, figs. 10 & 13.

Typhlomangelia nivalis (Lovén) figured ; *id. t. c.* p. 171, pl. xxxiii, fig. 12.

CANCELLARIIDÆ.

Cancellaria. Löffbecke's Monograph continued as far as species 79 ; none new.

RHACHIGLOSSA.

OLIVIDÆ.

Ancilla defended as against *Ancillaria* ; Watson, p. 228. *A. (Anaulax) nana*, n. sp., New Zealand ; *id. t. c.* p. 230, pl. xvii, fig. 10. *A. fusiformis*, *A. obtusa*, n. spp., Tasmania ; Petterd (2).

MARGINELLIDÆ.

Marginella (Glabella) pachia, *M. (G.) valida*, *M. (G.) brachia*, *M. (G.) alta*, Cape York, Australia, *M. (G.) agapeta*, Port Jackson, *M. (G.) chrysea*, Cape of Good Hope, *M. (G.) elata*, West Indies, n. spp., Watson, pp. 265-269, pl. xvi, figs. 5, 3, 4, 2, 9, 8, & 7. *M. (Granula) agger*, n. sp., West Indies, *id. t. c.* p. 271, pl. xvi, fig. 6. *M. lineolata*, *M. bairstowi*, n. spp., Port Elizabeth, Sowerby, (2) p. 9.

VOLUTIDÆ.

Cymbium papillatum, Schum., distinguished from *C. olla*, L. ; Nobre, (3) p. 11.

Guivillea, n. n. for *Wyvillea*, Wats. 1881 (*nec* Haswell, 1880) ; Watson, p. 261.

Voluta guntheri, n. sp., West Australia, Smith (4).

MITRIDÆ.

Mitra congesta, n. sp., = *M. ebenus* auctt. (*pars*) ; Locard, (1) pp. 105 & 540. *M. obtusa*, n. sp., = *M. cornicula*, Bucq., Dautz., & Dollf. (*pars*) ; *id. t. c.* pp. 107 & 541.

Mitrolumna major and *M. granulosa*, n. spp., = *M. olivoidea* varr. *major* et *granulosa*, Bucq., Dautz., & Dollf. ; *id. t. c.* pp. 109 & 542.

FASCIOLARIIDÆ.

Fasciolaria maderensis, Wats., = *F. armata*, A. Ad. ; Watson, p. 243, pl. xiii, fig. 1.

Fusus marmoratus, Philippi, includes *F. multicarinatus*, d'Orb. (*nec* Lmk.) ; *id. t. c.* p. 192. *F. valedictus*, n. sp., New Zealand, *id. t. c.* p. 201, pl. xvii, fig. 7. *F. (Siphonorbis) amblyterus*, n. sp., Portugal, *id. t. c.* p. 205, pl. xvii, fig. 8. *F. (Sipho) libratus*, n. n., = *F. dalli*, Wats. (*nec* Friele) ; *id. t. c.* p. 206. *F. carinulatus*, n. sp., = *Murex rostratus*, Brocchi ; Locard, (1) pp. 171 & 562.

Latirus bairstowi, *L. rousi*, n. spp., Port Elizabeth, Sowerby, (2) p. 8.

TURBINELLIDÆ.

Turbinella. Some particulars regarding the soft parts given by Dall (3), which confirm the usual opinion regarding its systematic position ; the genus differs from *Vasum*, Bolten, in its smooth surface.

BUCCINIDÆ.

Buccinidæ completed in Kobelt's *Iconographie* (16).

Buccinum frielei, n. sp., Kara Sea (= *B. mörchii*, Friele, *nec* *B. mörchianum*, Fischer, *nec* *B. mörchianum*, Dunker) ; Pfeffer, p. 5. *B. maltzani*, n. sp., *id. op. cit.* p. 7, figs. 8 & 9A, B. *B. hydrophanum*, *B. inextinctum*, *B. glaciale*, radulæ figured ; Becher.

Cominella puncturata, *C. unifasciata*, *C. angusta*, n. spp., Port Elizabeth ; Sowerby, (2) pp. 2, 3, & 4.

Euthria fusco-tincta, n. sp., Port Elizabeth, *id. t. c.* p. 2.

Phos smithi, n. sp., Pernambuco, Watson, p. 221, pl. xvii, fig. 9.

Pisania scabra, Monteros., figured for first time ; Kobelt (16).

Sipho geministriatus, n. sp., Kara Sea, Pfeffer, p. 4, figs. 1A, B.

Strombella, Gray, defended as against *Volutopsius*, Mörch ; Dall, (3) p. 303.

NASSIDÆ.

Amycla monterosatoi, *A. elongata*, n. spp., France, Locard, (1) pp. 143 & 554.

Canidia dorri, n. sp., Kao-hai, Cochin China, Wattebled, p. 58, pl. iii, fig. 5.

Nassa dissimilis, n. sp., New Zealand, Watson, p. 175, pl. xvii, fig. 6. *N. munieriana*, Crosse, = *N. pauperata* (Lmk.); *id. t. c.* p. 177. *N. isomera*, n. sp., Franco, Locard, (1) pp. 135 & 549. *N. interjecta*, n. sp., *id. t. c.* pp. 136 & 550. *N. valliculata*, n. sp., = *N. incrassata* var. *elongata*, Bucq., Dautz., & Dollf.; *id. t. c.* pp. 137 & 550. *N. jousseau mei*, = *N. incrassata* var. *minor*, Bucq., Dautz., & Dollf.; *N. elongatula*, = *N. pygmaea* var. *elongata*, Bucq., Dautz., & Dollf., n. spp.; *id. t. c.* pp. 139 & 551. *N. guernei*, n. sp., = *N. costulata* var. *lanceolata* et *pulcherrima*, Bucq., Dautz., & Dollf.; *id. t. c.* pp. 140 & 552. *N. ovoidea*, *N. subcostulata*, n. spp., *id. t. c.* pp. 142 & 553.

Spharonassa, n. g. for *Nassa mutabilis*, L.; *id. t. c.* pp. 132 & 548. *S. globulina*, n. sp., = *N. mutabilis* var. *minor*, Bucq., Dautz., & Dollf.; *id. t. c.* pp. 133 & 548.

COLUMBELLIDÆ.

Columbella (Anachis) halicæti, Jeffr., synonymy; Watson, p. 236. *C. procera*, n. sp., = *C. rustica*, L. (*pars*); Locard, (1) pp. 101 & 538. *C. lanceolata*, n. sp., = *C. scripta* var. *elongata*, Bucq., Dautz., & Dollf., 1883; *id. t. c.* pp. 102 & 539.

MURICIDÆ.

Muricidæ of the Lisbon Museum are catalogued by Furtado (3).

Concholepas redefined, regarded as allied to *Purpura*, and treated monographically by Mabilie (2). *C. similis*, pl. iv, Chili, *C. decipiens*, pl. iii, Peru, *C. granosus*, *C. densestriatus*, *C. rhombicus*, Chili, *C. splendens*, Chili and Peru, *C. verecundus*, Chili, *C. patagonicus*, Cape Horn, n. spp.; *C. peruvianus* figured, pl. v, figs. 1 & 2, *C. minor*, figs. 3 & 4: *id. op. cit.* For anatomical details, see p. 30, *antea*.

Murex ternispina, Kiener (*nec* Lamk.), = *M. crassispina*, L.; Watson, p. 149. *M. dentifer*, n. sp. (*indef.*), New Guinea, *id. t. c.* p. 153. *M. ædonius*, n. sp., Tristan da Cunha, *id. t. c.* p. 161, pl. xvii, fig. 5. *M. scalaris*, A. Ad., = *M. octogonus*, Q. & G.; Bednall, p. 64. *M. trispinosus*, n. sp., = *M. brandaris* (*pars*), Locard, (1) pp. 158 & 559; *M. brandariformis*, n. sp., = *M. brandaris*, Blv.; *id. t. c.* pp. 159 & 560. *M. porrectus*, n. sp., = *M. blainvillei*, Kien.; *id. t. c.* pp. 162 & 561. *M. subaciculatus*, n. sp., = *M. aciculatus*, Hid.; *id. t. c.* pp. 164 & 562.

Purpura oceanica, n. sp., = *P. hæmastoma* (*pars*), France; *id. t. c.* pp. 145 & 555. *P. celtica*, n. sp., = *P. lapillus* (*pars*); *id. t. c.* pp. 147 & 556.

Trophon muriciforme, Dall: change of name unnecessary, figured; Dall, (3) pl. iv, fig. 6.

TRITONIDÆ.

Tritonium glabrum, *T. danieli*, *T. curtum*, n. spp., Locard, (1) pp. 154, 156, 558, & 559. *T. cancellatum*, Lmk., distinguished from *T. oregonense*, Redf., and synonymies given; Dall, (2) p. 212.

CASSIDIDÆ.

Cassidaria bucuoyi, *C. dautzenbergi*, n. spp., = *C. echinophora* (pars); Locard, (1) pp. 150, 557, & 558.

Cassia adansonii, n. sp., = *C. saburon* (pars); *C. gmelini*, n. sp., = *C. sulcosa*, Kien.; Locard, (1) pp. 148 & 556. *C. tumida*, n. sp., Tasmania, Petterd (1). *C. (Bezourdice) wyvillei*, n. sp., Philippines, Watson, p. 408, pl. xiv, fig. 13.

CYPRÆIDÆ.

Trivia jousseau mei, n. sp., France, Locard, (1) pp. 93 & 535.

CHENOPODIDÆ.

Aporrhais bilobatus, n. sp., = *A. pes-pelecani* var., Locard, (1) pp. 192 & 568.

CERITHIIDÆ.

Aphanistylus moreleti, n. sp., Hué, Cochin China, Wattebled, p. 59, pl. iv, fig. 5.

Bittium perparvulum, Tongatabu, Australia, Honolulu, *B. diplax*, Amboina, *B. furum*, *B. xanthum*, *B. porcellanum*, Australia, *B. leucocephalum*, Honolulu, n. spp., Watson, pp. 554-559, pl. xxxviii, figs. 3-8. *B. bifusciatum*, n. sp., = *B. reticulatum* var.; Locard, (1) pp. 190 & 567.

Cerithiopsis ridicula, N. Australia, *C. turrigera*, Honolulu, n. spp., Watson, pp. 528 & 529, pl. xxxviii, figs. 1 & 2. *C. (stejnegeri* var.?) *truncata*, n. sp., Bering Sea, Dall, (3) p. 304, pl. iv, fig. 5.

Cerithium provinciale, *C. subvulgatum*, *C. bourguignati*, *C. servaini*, *C. muticum*, *C. stenodeum*, *C. strumaticum*, *C. massiliense*, n. spp., France, Locard, (1) pp. 179-182 & 563-566.

Triforis dolicha, *T. rufula*, n. spp., N. Australia, Watson, pp. 565-567, pl. xlii, figs. 1 & 2. *T. obesulus*, n. sp., = *T. perversus* var. *obesula*, Bucq., Dautz., & Dollf.; Locard, (1) pp. 187 & 556.

PLANAXIDÆ.

Quadrasia, n. g. "Testa imperforata, oblongo-ovata, utrinque attenuata, solida, nassæformis, haud nitens, transversim striatula; spira subelongata, apice lævigato, nitido, obtuso, inflexo; anfractus sat numerosi, altimus spiram superans; apertura angulato ovata; peristoma, incrassatum, marginibus callo crasso, concolore junctis, columellari dilatato, basi tuberculum obtuse rotundatum emittente, mox interruptum, basali valde emarginato, mox rotundato, externo arcuato, crasso suturam haud attingente. Operculum ovale, subarcuatum, tenue, corneum, paucispirum, nucleo fere terminali." For *Q. hidalgoi*, n. sp., Philippines, Crosse (5).

VERMETIDÆ.

Vermetidæ contain the genera *Vermetus*, *Siliquaria*, and *Cryptobia*; Tryon, (1) p. 165.

Vermetus contains subgg. *Bivonia*, *Spiroglyphus*, *Thylacodes*, *Siphonium*, *Stephoma*, *Burtinella*, *Tubulostium*, and *Vermicularia*; *id. t. c.* p. 166. *V. (?) cyclicus*, n. sp., North Australia, Watson, p. 465, pl. xxxi, fig. 1 (? n. g. *Ctiloceras*).

TURRITELLIDÆ.

Turritellidæ contain *Turritella*, *Protoma*, *Glauconia*, and *Mathilda*; Tryon, (1) p. 193.

Mathilda elegantissima, Costa, includes *M. cochleiformis*, *M. granolirata*, *M. retusa*, Costa, and *M. puniculata*, Tiberi; *id. t. c.* p. 210.

Turritella has as subgg. *Mesalia*, *Arcotia*, and *Lithotrochus*; *id. t. c.* p. 198. *T. fascialis*, Menke, is from Japan and China Sea; *id. t. c.* p. 197. *T. gonistoma*, Val., numerous synonyms; *id. t. c.* p. 198.

CÆCIDÆ.

Cæcidæ made to include only the one genus, *Cæcum*, with subgg. *Meioceras*, *Strebloceras*, *Watsonia*, and *Parastrophia*; Tryon, (1) p. 213. 16 specimens enumerated from the 'Challenger' collection; most new species were described in 1879: Folin, pp. 680-689.

Cæcum angustum, *C. eburneum*, n. spp., North Australia, *id. t. c.* p. 688, pl. 1, figs. 8 & 9: intermediate forms noted between *C. trachea*, *C. pollicare*, and *C. vitreum*; *id. t. c.* p. 689. *C. glabrum*, Mont., includes *Dentalium minutum*, L., *Brochus levis* and *B. arcuatus*, Brown; *Cornuoides minor*, Brown, *Odontidium levissimum*, Cantr., and *Vermiculum incurvatum*, Mont.; Tryon, (1) p. 215. *C. orcutti*, n. sp., California, Dall in Orcutt, P. U. S. Nat. Mus. viii, p. 541. *C. californicum*, n. n., = *C. cooperi*, Smith; *id. ibid.*

MELANIIDÆ.

Kobelt (11) continues his index to the family with the genera, *Melania*, *Tiphobia*, and *Bourguignatia*. Palearctic species defined by Westerlund, (2) pp. 102-131.

Hilacantha, n. n., = *Tiphobia*, Smith, preocc.; Ancey (5).

Melania gottschei, *M. forticosta*, *M. coreana*, *M. nodifila*, *M. globus*, n. spp., Korea, Martens (2). *M. andersoni*, *M. mariesi*, n. spp., Japan, Smith (3). *M. subcrenulata*, *M. minutissima*, *M. kaohaiensis*, n. spp., Hué, Cochin China, Wattebled, pp. 60-62, pls. iii, figs. 3 & 2, & iv, fig. 6. *M. walloriensis*, n. sp., New Guinea, Brazier, (2) p. 843. *M. (Melanoides) gredleri*, n. n. for *M. tumida*, Gredl. (*nec* Tristram); Bøttger, (4) p. 10. *M. (Sermyla) sculpta*, Soul., includes *M. crebricostis*, Nevill (*nec* Benson); *id. t. c.* p. 12. *M. (?) Sulcospira) schmackeri*, n. sp., Hunan, *id. t. c.* p. 3.

Paludomus (?) *hilberi*, n. sp., Hunan, Gredler, (2) p. 19.

Semisulcospira, n. sect. *Melania*. "Habitu sect. *Sulcospira*, Trosch., t. modica, ovato-turrita, spiraliter sulcato-striata, anfr. ultimo minus distincte carinato, operculo paucispinato, anfr. solum $1\frac{1}{2}$, nucleo basali ad $\frac{1}{4}$ altitudinis posito." For *M. libertina*, Gould, &c.; Boettger, (3) p. 4. *M. (S.) japonica*, Rv., is distinct from this; *id. t. c.* p. 5. *M. (S.) multi-granosa*, n. sp., Japan, *id. t. c.* p. 7. *M. (S.) niponica*, Smith, includes *M. briva*, Kobelt; *id. t. c.* p. 8.

Tiphobia longirostris, *T. jouberti*, *T. bourguignati*, n. spp., Tanganika, with figs.; Bourguignat (2).

LITTORINIDÆ.

Aquilonaria, n. g. "Shell lioplaciform, more or less membranous, thin, imperforate, without sculpture, but with a rough, transversely shaggy epidermis. Operculum subspiral, with a raised subspiral rib on the inner side. Animal much like *Litorina*, with entire sole, short and peculiar radula." For *A. turneri*, n. sp., Ungava Bay, Labrador, Dall, (1) p. 204, pl. iii, figs. 1, 2, & 3.

Haloconcha, n. n. [= *Lacunella*, Dall, 1885, *nec* Desh. (*cf.* Zool. Rec. xxii, *Moll.* p. 86)]; Dall, (2) p. 212.

Lucina intermedia, n. sp. (= *L. puteolus*, F. & H., *pars*), France; Locard, (1) pp. 290 & 581.

Littorina danieli, n. sp. (= *L. obtusa*, Dan., *pars*), France; *id. t. c.* pp. 283 & 578. *L. armoricana*, *L. sphaeroidalis*, n. spp. (= *L. littorea*, *pars*), France; *id. t. c.* pp. 285 & 580.

FOSSARIDÆ.

Iphitus tuberculatus, n. sp., West Indies, Watson, p. 583, pl. xlvii, fig. 5.

SOLARIIDÆ.

Anatomy of the family, see p. 29, *antea*.

Bifrontia pernambucensis, n. sp., Pernambuco, Watson, p. 137, pl. viii, fig. 13.

SKENEIIDÆ.

Skeneia trochiformis, n. sp. (= *S. planorbis* var.), France; Locard, (1) pp. 299 & 581.

RISSOIDÆ.

Alaba (Diala) albugo, n. sp., N. Australia, Watson, p. 568, pl. xlii, fig. 3. *A. (Stiliferina) striata*, Fiji, Tahiti, *A. (S.) sulcata*, *A. (S.?) fulva*, N. Australia, n. spp., *id. t. c.* pp. 569-572, pl. xlii, figs. 6, 7, & 5.

Alvania aurivillii, n. sp., Bering Sea, Dall, (3) p. 308, pl. iv, fig. 8. *A. russinoniaca*, n. sp. (= *Rissoa carinata*, Bucq., Dautz. & Dollf.), France; Locard, (1) pp. 248, 574.

Barleeia elongata, n. sp. (= *B. rubra* var., Bucq., Dautz. & Dollf.), *id. t. c.* pp. 272 & 576. *B. imbricata*, n. sp., Fiji, Australia, Honolulu, Watson, p. 584, pl. xliii, fig. 2.

Pyrgulopsis, n. g. "Shell minute, conically turreted, somewhat elongated, imperforate, unicarinate; apex acute; aperture ovate; peritreme continuous": for *Pyrgula nevadensis*, Stearns, 1883; includes also *P. mississippiensis*, Illinois, and *P. spinosus*, Texas, n. spp.; Call & Pilsbry: the latter probably referable to *Potamopyrgus*; Pilsbry.

Rissoa pyrrhias, *R. microstoma*, W. Indies, *R. xanthias*, W. Indies, Pernambuco, *R. fuyalensis*, Azores, *R. ambliia*, Canaries, *R. pernambucensis*, Pernambuco, n. spp., Watson, pp. 588-591, pl. xliv, figs. 4, 5, & 7-10. *R. (Alvania) didyma*, W. Indies, *R. (A.) tarsodes*, Azores, *R. (A.) tractatus*, N. Australia, *R. (A.) tuscinea*, Tristan da Cunha, n. spp., *id. t. c.* pp. 594-597, pl. xliv, figs. 1, 2, 6, & 3. *R. euchila*, n. sp., = *R. novarensis*, Wats. (nec Frauentfeldt), *id. t. c.* p. 602. *R. protensa*, *R. neglecta*, n. spp. (= *R. variabilis* var., Bucq., Dautz., & Dollf.), France, Locard, (1) pp. 256 & 575. *R. verrilli*, n. sp., North Sea, Friele, p. 27, pl. xi, fig. 5a. *R. (Cingula) islandica*, n. sp., North Sea, *id. op. cit.* p. 28, pl. xi, figs. 8 & 9. *R. (C.) rustica*, Pernambuco, *R. (C.) scopulorum*, Honolulu, *R. (C.) alvearium*, W. Indies, n. spp., Watson, pp. 604-606, pl. xliv, fig. 11, pl. xlv, fig. 4, pl. xlvii, fig. 1. *R. (Onoba) brachia*, W. Indies, *R. (O.) aëdonis*, Tristan da Cunha, *R. (O.) mercurialis*, N. Australia, n. spp., *id. t. c.* pp. 599-601, pl. xlv, figs. 8, 5, & 12. *R. (Ceratia) glaphyra*, *R. (C.) macra*, Tristan da Cunha, *R. (C.) pachia*, Pernambuco, *R. (C.) transenna*, Prince Edward I., n. spp., *id. t. c.* pp. 601-604, pl. xlv, figs. 6, 7, 9, & 10. *R. (Scrobs) scrobiculator*, *R. (S.) badia*, n. spp., Port Jackson, *id. t. c.* pp. 611-613, pl. xlvii, figs. 4 & 3. *R. (Setia) marionensis*, *R. (S.) edwardiensis*, Prince Edward I., *R. (S.) principis*, Prince Edward I., Kerguelen, *R. (S.) australis*, *R. (S.) sinapi*, Kerguelen, *R. (S.) philomela*, Tristan da Cunha, *R. (S.) quisquiliarum*, Azores, *R. (S.) triangularis*, Ascension Is., n. spp., *id. t. c.* pp. 607-611, pl. xlv, figs. 12 & 13, pl. xlv, figs. 1-3, 11, & 13, pl. xlvii, fig. 2.

Rissoina scalariformis, *R. honoluluensis*, Honolulu, *R. triangularis*, *R. mercurialis*, N. Australia, *R. transenna*, Fiji, n. spp., *id. t. c.* pp. 617-621, pl. xlvii, figs. 6-10.

HYDROBIIDÆ.

Palaearctic species of *Hydrobiidae* defined by Westerlund, (2) pp. 13-102.

Bithinia chaperi, n. sp., Tonkin, Morlet, (4) pp. 263 & 286, pl. xiv, fig. 3. *B. morleti*, *B. subcarinata*, *B. dautzenbergiana*, n. spp., Hué, Cochinchina, Wattebled, pp. 62-65, pl. iii, figs. 8, 7, & 6.

Hydrobia texana, n. sp., Texas, Pilsbry.

Limnotrochus appears to be related to *Littorina*, and especially *Tectarius*; Pelseneer, (4) p. 105.

Lithoglyphus modestus, n. sp., Hunan, Gredler, (2) p. 17.

Spekeia, genus unnecessary; Pelseneer, (4) p. 106.

Stenothyra tonkiniana, n. sp., Tonkin, Morlet, (4) pp. 263 & 287, pl. xiv, fig. 4.

Tanganyicia: the creation of this genus not justified; Pelseñeer, (4) p. 106.

Vitrella sandbergi, Muggendorf, *V. gibbula*, *V. elongata*, *V. gracilis*, *V. mænana*, Aschaffenburg, n. spp., with figs.; Flach, (2).

Wattebledia, n. g. "Testa imperforata, nassæformis; spira elongato-turbinata, apice obtusulo; sutura impressa; anfr. 4-4½ convexiusculi, ultimus non descendens; apertura subtriangulari-piriformis; peristoma continuum, incrassatum, subtriangulari-piriformis, margine columellari arcuato, basali subhorizontali, medio vix subinflexo, cum columellari angulum formante, externo flexuoso, bisinuato, paulo infra medium prominulo.—Operculum crassiusculum, corneo-calcareum, striis vix conspicuis, concentricis impressum, nucleo subcentrali." For *Bithinia crosseana*, Wattebled [J. de Conch. xxxii, p. 127, 1884]; Crosse (1).

PALUDINIDÆ.

Palæarctic species of *Paludinidæ* defined by Westerlund, (2) pp. 2-13.

Bellamyia, n. g., distinguished by blunt keels, fine circular striæ on the whorls of the spiral; narrow umbilicus, canal at the base of the aperture, border of the peristome marginate; operculum like that of *Vivipara*. For *B. bellamyia*, n. sp., Upper Senegal; Jousseau, (1) pp. 478-480, pl. xiii, fig. 3: also includes *Vivipara duponti*, Rochebr.

Campeloma redefined, 13 species described; Call (3).

Cleopatra pirothi and n. var. *unicarinata*, Egypt; v. Martens, (4) p. 126.

Paludina kowayiensis, n. sp., New Guinea, Brazier, (2) p. 843. *P. longispira*, n. sp., probably = *P. ingallsiana*, Kobelt nec Reeve, Japan; Smith (3).

Neothauma: the erection of this genus unnecessary; Pelseñeer, (4) p. 104.

Vivipara delavayi, *V. francheti*, *V. tropidophora*, *V. limnophila*, *V. sece-neuda*, n. spp., with figs, Lake Ta-li; Mabille (3).

VALVATIDÆ.

Palæarctic species of *Valvatidæ* defined by Westerlund, (2) pp. 131-145.

Valvata (Cincinna) sorensis, Balschoi Lake, Siberia, *V. bathybia*, Lake Baikal, n. spp., with figs. and account of anatomy; Dybowski (3).

AMPULLARIIDÆ.

Palæarctic species of *Ampullariidæ* defined by Westerlund, (2) pp. 1 & 2.

Ampullaria africana, n. sp., Gold Coast, Martens (3).

Lanistes magnus, *L. zambesianus*, *L. ellipticus*, n. spp., Luapula and Zambesi, Africa, *L. ovum*, Peters, Zambesi; Furtado, (4), pp. 147-152, pls. vi, fig. 3, & vii, fig. 1.

ASSIMINEIDÆ.

Assimineæ (?) *obtusa*, *A. elegans*, n. spp., Hué, Cochin China, Wattedled, pp. 65 & 66, pls. v, fig. 1, & iv, fig. 7.

Paludinella brusinae, Dalmatia, p. 36, *P. thiesseæ*, Eubœa, *P. multzani*, Crete, p. 37, n. spp., Westerlund (2).

CYCLOPHORIDÆ.

Adelomorpha, n. sect. *Cyclotus*, for *C. (A.) acanthoderma*, n. sp., Ramoi, Tapparone-Canefri, p. 166, pl. ii, figs. 20 & 21.

Cyclotus tunicatus, Arfak Mts., *id.* p. 197, pl. ii, figs. 18 & 19.

Alycæus elevatus, *A. diminutus*, *A. pentagonus*, n. spp., Chen Kiu, Heude, (1) pp. 210 & 211. *A. plicilabris*, *A. cristatus*, *A. inflatus*, *A. nanus*, n. spp., Hunan, Möllendorff, (2) pp. 167–170, pl. v, figs. 5–8.

Cyclophorus dilatatus, *C. soloensis*, n. spp., Yunan, Heude, (1) pp. 208 & 209. *C. jourdyi*, n. sp., Tonkin, Morlet, (4) pp. 260 & 281, pl. xiv, fig. 1. *C. trouieensis*, n. sp., Trouie, Cochin China, Wattedled, p. 55, pl. iv, fig. 1.

Cyclotus fossor, n. sp., Hupé, Heude, (1) p. 210.

Diplommatina occidentalis in Trinidad; Guppy. *D. consularis*, n. sp., Hunan, Gredler, (2) pp. 13–15. *D. contracta*, *D. herziana*, n. spp., Huboi and Hainan, Möllendorff, (2) pp. 173–176. *D. sculptilis* = ? *D. paxillus*, Gredl.; Gredler, (1) p. 19. *D. (Palaina) balansai*, n. sp., Tonkin, Morelet, (4) pp. 261 & 284, pl. xiii, fig. 1.

Lagocheilus crossei, *L. fischeri*, *L. mariei*, n. spp., Tonkin, Morlet, (4) pp. 260 & 277–281, pl. xiii, figs. 2, 3, & 4. *L. glabratus*, n. sp., Hunan, Möllendorff, (2) p. 163, pl. v, fig. 2.

Leptopoma manhanense, *L. pyramis*, *L. distinguendum*, *L. dubium*, *L. bipartitum*, *L. amalie*, *L. approximans*, n. spp., Philippines, Kobelt (2). *L. pumilum*, Arfak Mts., *L. apicale*, Sorong, Ramoi, *L. aurantiellum*, West Coast, *L. callichloros*, Ramoi, *L. puniceum*, Geelvink Bay, *L. nigri-labrum*, West Coast, *L. gianelli*, Katan, n. spp., Tapparone-Canefri, pp. 173–183, pl. ii.

Mesostoma, n. g. “Testa pupiniformi, apertura semilunari, peristomate interrupto; columella fissa, margine dextro integro, callo parietali dentem fissuram pupinalem simulante.” For *Pupina destructa*, Heude (Mem. Hist. Nat. Emp. Chinois, 3, pl. xxiv, fig. 15); Heude, (1) p. 211. [*Nom. præocc.*—REC.]

Myxostoma, Trosch., which Heude has erected into a genus for various species, cannot include these forms, as neither the characters of their shells nor opercula agree with the type: they are referable to *Ptychopoma*, v. Möll.; Möllendorff (1). The shell which Heude calls “*M. lienense*, Gredl.,” is not *Pterocyclos lienensis*, Gredler, but *Cyclophorus (Ptychopoma) chinensis* var. *cyclotea*, Gredl.; *id. t. c.* p. 100. *M. subulatum*, n. sp., Setchuan, Heude, (1) p. 209.

Opisthoporus simonianus, *O. (?) borealis*, n. spp., Cochin China and Setchuan, Heude, (1) pp. 209 & 210.

Pomatias, 10 additional palæarctic forms; Westerlund, (3) pp. 14 & 15.

P. auritus, Rossm., n. var. *meridionalis*, Dalmatia, Boettger, (5) p. 41. *P. perseianum*, n. sp., Tunis, Kobelt, (1) p. 48. *P. pauluccianus*, Caroli, figured; Paulucci, pl. ii, fig. 7. *P. liburnicus*, named without description by Hirc, p. 380. *P. oostoma*, Westerl., new to Croatia; *id. t. c.* p. 388.

Pterocyclus danieli, n. sp., Tonkin, Morlet, (4) pp. 261 & 283, pl. xiv, fig. 2. *P. hensanensis*, n. sp., Hunan, Gredler, (2) p. 11.

Pupina fuchsi, n. sp., Hunan, Gredler, (1) p. 9.

Spirostoma, Heude, is unnecessary, being identical with *Ceolopoma*, Ad.; Möllendorff, (1) p. 101.

Tomocyclus: several species from Mexico described, with figures; Fischer & Crosse, pp. 113-128.

CYCLOSTOMATIDÆ.

Anceyiella, n. g. for *Cyclostoma æquivoquum*, Pfeiffer, 1858, Madagascar; Mabilie, (1) p. 128.

Cistula subangulata, n. sp., Guatemala, Martens (5).

Cyclostoma andrewsæ, n. sp., Honduras, Ancey, (9) p. 251. *C. denansi*, *C. spartopolium*, *C. cognatum*, *C. subzonatum*, *C. cnisum*, *C. omoium*, *C. subcampanulatum*, *C. dyganum*, *C. jousseaumianum*, *C. cerastum*, *C. myrtinum*, n. spp., Madagascar, Mabilie, (1) pp. 128-135. *C. simulacrum*, Morelet, referred to *Tomocyclus*; Fischer & Crosse, p. 121.

Pseudopomatias, MlIdf. [*cf.* Zool. Rec. xxii, *Moll.* p. 91]: aperture like that of *Adamsiella*, in addition to the operculum; Gredler, (1) p. 16.

ACICULIDÆ.

Acicula lauta, n. sp., Riconali, Paulucci, p. 46, pl. ii, fig. 4.

Acme delpretei figured; *id.* pl. ii, fig. 6.

TRUNCATELLIDÆ.

Fargesia, n. g. "Testa conico-turriculata, spira acuminata, rimoso-perforata; apertura recta, peristomate circulari, subduplice, incrassato. —Operculo corneo, tenuissimo, quatuor anfractibus, sutura marginata pellucida." For *F. cornea*, n. sp., Chen Kiu, Heude, (1) p. 211.

Truncatella fasciata, n. sp., Aru Is., Tapparone-Canefri, p. 193, pl. ii, fig. 24.

HIPPONYCIDÆ.

Mitralaria, Schum., includes *Omorina*, Risso, *Mitrella*, *Trochilina*, *Trelania*, and *Poculina*, Gray, *Lithedaphus*, Owen, and *Calyptræa*, Lmk., 1801 (*nec* 1799); Tryon, (1) p. 108.

CAPULIDÆ.

Addisonia, contains only one species, *A. lateralis* (Requien), including *Gadinia excentrica*, Tiberi, and *A. paradoxa*, Dall: complete synonymy given; Dautzenberg.

Addisonia, Dall, placed near *Fissurella*; Tryon, (1) p. 107.

Capulus includes as subgg. *Metoptoma* and *Spiricella*; Tryon, (1) p. 106.

Calyptræidæ divided into two subfamilies, *Calyptræinæ* and *Hipponycinæ*, with genera *Crucibulum*, *Calyptræa*, *Crepidula*, *Capulus*, *Amathina*, *Hipponyx*, and *Mitrularia*, and several fossil genera; Tryon, (1) p. 101; many of the species have very extensive synonymies.

Calyptræa includes the subgg. *Galeropsis*, *Infundibulum*, and *Sigapatella*; *id. t. c.* p. 103. *C. spirata*, Nardo, see p. 47, *supra*.

Trochatella simpsoni, n. sp., Honduras, Ancey, (9) p. 253.

XENOPHORIDÆ.

Xenophoridæ contain the genera *Xenophora* (with subg. *Eudoptygma*), *Eutrochus*, *Autodetus*, and *Clisospira*; Tryon, (1) p. 157. Crosse (J. de Conch. xxvi, p. 251) objects to the use of *Onustus* as a sectional name.

NARICIDÆ.

Vanikoro clathrata, Recl., several synonyms; Tryon, (1) p. 68. *Narica*, Recl., preferable as a generic name; Crosso, J. de Conch. xxvi, p. 106.

LAMELLARIIDÆ.

Lamellaria, Mont., includes *Marsenia*, Leach, *Coriocella*, Blv., *Chelynotus*, Swains., *Cryptocella*, H. & A. Ad., *Ermæa*, Gray, and *Cryptothyra*, Menko: *Chelynotus* and *Marsenina* are adopted as subgg.; Tryon, (1) p. 11. *L. perspicua*, L., var. *lata*, numerous synonyms given; *id. t. c.* p. 60. *L. wilsoni*, n. sp., Port Phillip Bay, S. Australia, Smith (5). *Morvillia grandis*, n. sp., Jan Mayen, Becher, p. 74, fig. 4.

Velutina derugata, n. sp., Jan Mayen, *id. t. c.* p. 74, fig. 3. *V. conica*, n. sp., Bering Sea, Dall, (3) p. 305, pl. iii, fig. 10. *V. schneideri*, n. sp., Tromsø, Friele, p. 26, pl. xi, figs. 3 & 4.

MARSENIADÆ.

A detailed history and bibliography of the family are given by Bergh (1, 5, prelim. notice, 2), with an account of its anatomy, habits, and distribution. It contains the following genera:—*Marsenia* (20 spp.), *Chelynotus* (4 sp.), *Marseniella* (1 sp.), *Marseniopsis* (2 spp.), *Marsenina* (6 spp.), and *Onchidiopsis* (2 spp.). They are arranged thus:—

Plica expiratoria nulla	lingualis	1-1-1	{ <div> pars inferior vasis deferentis non libera pars inferior vasis deferentis libera </div>	<div> <i>Chelynotus</i>, Swains <i>Marsenia</i>, Leach <i>Marseniella</i>, Bgh. </div>	} diœcia
Plica expiratoria	armatura	3-1-3	testa interna calcarea ...	<i>Marseniopsis</i> , Bgh.	} monœcia
			testa semi-interna calcarea	<i>Marsenina</i> , Gray	
			testa interna cornina ...	<i>Onchidiopsis</i> , Bgh.	

Chelyonotus, 4 species (none new); Bergh, (5) p. 175: anatomy, pp. 193-225.

Marsenia. 20 species enumerated (p. 162), the following new:—*M. cabulana*, *M. affinis*, *M. indecora*, *M. diegoënsis*, Dall, MS.; Bergh, (5) pp. 171 & 172. *M. dubia*, n. sp., off Cape Verde, Bergh, (1) p. 16, pl. i, figs. 1-6.

Marseniella, n. g. "Animalia dioecia, *Marseniis* propriis similia. Lamellæ branchiales, lamellæ mandibulares et armatura lingualis ut in *Marseniis*. Proventriculus deest. Pars inferior varis deferentis ut in *Marseniis* libera. Testa fere cornina; spira minuta; anfractus ultimus maximus, postice solutus." For *M. borealis*, n. sp., Florø, Bergen; Bergh, (1) p. 14, and (5) p. 178.

Marsenina. 6 species enumerated (p. 182); *M. dalli*, n. sp., North Pacific; Bergh, (5) p. 185.

Marseniopsis, n. g. "Animalia dioecia forma generali *Onchidiopsibus* similia, corpore ita quasi sphæroideo, quasi inflato, sed solummodo plica et semicanali (inspiratoria antica); os externum subanticum.—Lamellæ mandibulares minores, angustæ. Armatura lingualis fere ut in *Marseniis* et in *Onchidiopsidibus* (2-1-1-1-2). Testa interna calcarea ut in *Marseniis*." For *M. pacifica* and *M. murrayi*, n. spp., Pacific Ocean; *id.*, (1) pp. 18-24, pl. i, figs. 7-38, and (5) p. 179.

NATICIDÆ.

Naticidæ divided into subfamilies *Naticinæ*, *Lamellariinæ*, and *Vanikoridæ*; and into the genera *Natica*, *Rumella*, *Sigaretus*, *Lamellaria*, *Oncidiopsis*, *Caledoniella*, *Velutina*, and *Vanikoro*: Tryon, (1) pp. 1-12. *Naticinæ* to be preferred to *Vanikoridæ*; Crosse, J. de Conch. xxvi, p. 106.

Lunatia heros figured by Reeve under name *Natica duplicata*; Tryon, (1) p. 34.

Natica fulminea, Gm., includes *N. cruentata* and *N. arachnoidea*, Gm., *N. pardalis*, Phil., *N. bifasciata* (Recluz), Rv., and *N. punctata*, Swains.; *N. senegalensis* probably distinct: *id. t. c.* p. 15. *N. ala-papilionis*, Chem., includes *N. zonaria*, Lmk., *N. crenata*, Recl., *N. articulata*, Phil., and *N. tæniata*, Menke; *id. t. c.* p. 21. *N. picta*, Recl., includes *N. elegans*, *N. euzona*, Recl., and *N. decora*, Phil.; *id. t. c.* p. 22. *N. marochiensis*, Gm. (non Lmk.), includes *N. cayennensis*, *N. sagittifera*, and *N. souleyetiana*, Recl., *N. undulata*, Pease, *N. manceli*, Jouss., *N. undata*, Phil., and perhaps *N. gualteriana*, Petit; *id. t. c.* p. 23. *N. ampla*, Phil., numerous synonyms; *id. t. c.* p. 33. *N. pallida*, Br. & Sow., many synonyms; *id. t. c.* p. 37; so also *N. uber*, Val., and *N. lactea*, Guild.; *id. t. c.* pp. 48 & 49. *N. grisea*, v. Mart., Kerguelen, figured; Watson, p. 432, pl. xxviii, fig. 5. *N. seychellium*, n. sp., = *N. mahesense*, Rv. (nec *N. mahesiensis*, Dufo); *id. t. c.* p. 434. *N. effossa*, Melbourne, *N. insularum*, Arafura Sea, *N. psila*, Cape of Good Hope, n. spp., *id. t. c.* pp. 439-443, pl. xxviii, figs. 3, 2, & 1. *N. (Neverita) didyma*, Bolten, synonymy discussed; *id. t. c.* p. 450. *N. neustriaca*, n. sp. (= *N. alderi* var.), France; Locard,

(1) pp. 276 & 576. *N. complanata*, n. sp., *id. t. c.* pp. 276 & 577. *N. crassatella*, n. sp., *id. t. c.* pp. 278 & 577.

Sigaretus concavus, Lmk., includes *S. maximus*, Phil., *S. cymba*, Menko, *S. grayi*, Desh., *S. neritoides*, Recl. (*nec* L.), *S. latifasciatus*, Rv. (*nec* Ad. & Rv.), *S. haliotideus*, Rv. (*nec* L.); Tryon, (1) p. 55. *S. neritoides*, L., includes *S. latifasciatus*, Ad. & Rv., *S. javanicus*, Gray, *S. insculptus*, Ad. & Rv., and *S. leachii*, Phil.; *id. ibid.*

OOCORYTHIDÆ.

Oocorys sulcata, Fischer, figured, and likeness to *Benthodolium abyssorum*, Vll., noticed; Watson, p. 412, pl. xvii, fig. 11.

SEQUENZIIDÆ.

Sequenzia belongs to the *Tenioglossa*; Verrill, p. 526.

PTENOGLOSSA.

IANTHINIDÆ.

Ianthinidæ. Anatomy, see p. 29.

Recluzia rollandiana, Petit, n. var. *β annamitica*, Hué, Cochin China; Wattebled, p. 67, pl. iii, fig. 4.

SCALARIIDÆ.

Scalidæ. A monograph, commencing with the subgenus *Criposcala*, is undertaken by de Boury.

Scalariidæ. Anatomy, see p. 29.

Aclis minutissima, n. sp., N. Australia, Watson, p. 504, pl. xxxiii, fig. 9.

Criposcala, n. subg., for *Scalaria crispa*, Lmk.; de Boury, p. 1, pl. i, figs. 1-5. *C. plesiomorpha*, p. 5, *C. junctilamella*, p. 11, Eocene, France, *C. jousseaumei*, p. 13, New Caledonia, *C. dodanti*, p. 15, *C. johannæ*, p. 27, Eocene, France, *C. humilis*, p. 29, hab.?, *C. chaussyensis*, p. 31, Eocene, France, *C. flexilamella*, p. 33? = *Scalaria crispa*, Kien. (*nec* Lamk.); *C. acutilamella*, p. 43, *C. condensata*, p. 45, Eocene, France, n. spp., includes also 14 other species, nearly all figured; de Boury.

Scalaria vermetiformis, Pernambuco, *S. phillata*, Tristan da Cunha, *S. (Acirsa) pyrrhias*, W. Indies, n. spp., Watson, pp. 142 & 145, pl. ix, figs. 6, 5, & 7. *S. obsita*, n. sp., Locard, (1) pp. 196 & 568.

GYMNOGLOSSA.

EULIMIDÆ.

Eulimide contain *Eulima*, *Scalenostoma*, *Niso*, *Holopteron*, *Stylifer*, *Entoconcha*, *Euchrysalis*, *Macrocheilus*, *Bourgetia*, *Loxonema*, *Strobeus*,

Orthonema, *Rigauxia*, *Chimacina*, *Subulites*, and *Chemnitzia*; Tryon, (1) p. 258.

Eulima includes as subgg., *Subularia*, *Bacula*, *Apicalia*, *Mucronalia*, *Selma*, *Styliferina*, *Lambertia*, *Amaurella*, *Eulimopsis*, and *Iopsis*; *id. t. c.* p. 259. *E. tenison* (? *tenisoni*.—REC.), n. n., = *E. micans*, Tenison-Woods (*nec* Carp.); *id. t. c.* p. 269. *E. robusta* and *E. mundula*, A. Ad., figured; *id. t. c.* pl. 68, figs. 25 & 26. *E. lauræ*, n. sp., North Sea, Friele, p. 30, pl. xi, figs. 13 & 14.

Mucronalia xanthias, n. sp., Tongatabu, N. Australia, Philippines, Watson, p. 523, pl. xxxvii, fig. 8.

Niso agleës, n. sp., 14 fath., C. Hatteras, Bush, (2) p. 585.

Scalenostoma includes *Subeulima*; Tryon, (1) p. 261. *S. lubrica*, Mauritius, *S. mariei*, New Caledonia, n. spp., Fischer (4).

Stylifer includes as subgg. *Cythnia* and *Plicifer*; Tryon, (1) p. 262. *S. crotaphis*, n. sp., Bass Strait, Watson, p. 525, pl. xxxvii, fig. 10.

Stylina sp., for details, see p. 30.

PYRAMIDELLIDÆ.

Pyramidellidæ include *Pyramidella*, *Syrnolopsis*, *Nerinæa*, and *Soleniscus*; Tryon, (1) p. 295.

Eulimella rudis, Pernambuco, *E. acerrima*, *E. angusta*, *E. laxa*, *E. coacta*, *E. subtilis*, N. Australia, n. spp., Watson, pp. 496–499, pl. xxxiii, figs. 2–7.

Odostomia convoluta, *O. corpulenta*, *O. oxia*, *O. oödes*, *O. pupa*, *O. kymatodes*, N. Australia, *O. hyphala*, New Zealand, *O. scopulorum*, Honolulu, n. spp., *id. t. c.* pp. 482–487, pls. xxxiii, fig. 8, & xxxi, figs. 3, 4, 6–8, 2, & 5; *O. (Turbonilla) scalpidens*, Port Jackson, *O. (T.) philomela*, Tristan da Cunha, *O. (T.) homæotata*, *O. (T.) rhabdoides*, *O. (T.) dipsycha*, *O. (T.) amœbaea*, N. Australia, *O. (T.) rhabdota*, *O. (T.) kymatoessa*, *O. (T.) phrikalea*, West Indies, n. spp., *id. t. c.* pp. 489–595, pls. xxxii, figs. 1–8, & xxxiii, fig. 1. *O. sublustris*, North Sea, *O. normani*, Bergen, n. spp., Friele, p. 29, pl. xi, figs. 11a & 12.

Parthenina flexicosta and *P. bucquoyi*, n. spp., Locard, (1) pp. 222, 227, & 572.

Pyramidella has as subgg. *Otopleura*, *Syrnola*, *Chrysallida*, and *Actæopyramis*; Tryon, (1) p. 297.

Turbonillidæ include *Turbonilla*, *Lia*, *Murchisoniella*, *Vanesia*, *Eulimella*, and *Odostomia*; *id. t. c.* p. 317.

Turbonilla has the subg. *Dunkeria*; *id. t. c.* p. 318. *T. lactea*, L., includes *T. elegantissima*, Macg., *T. acuta*, Donovan, *T. alba*, Penn., *T. plicatula*, Risso, *T. turritella*, Scacchi, and *T. gracilis*, Desh.; *id. t. c.* p. 322.

SCUTIBRANCHIATA.

RHIPIDOGLOSSA.

HELICINIDÆ.

Helicina deroulei, n. sp., Tourane, Cochin China, Wattebled, p. 66, pl. v, fig. 2. *H. setchuanensis*, Heude, type of the genus *Heudeia*, Crosse,

1885, is a *Proserpina*; Möllendorff, (1) p. 101. *H. jobiensis*, n. sp., Jobi, Tapparone-Canefri, p. 77, pl. ii, figs. 22 & 23. *H. neglecta*, n. sp., Jobi, *id.* p. 190, pl. i, figs. 16 & 17.

HYDROCENIDÆ.

Hydrocena japonica, n. sp., Japan, Martens (2).

NERITIDÆ.

Palearctic species of *Neritidæ* defined by Westerlund, (2) pp. 145-156.

N. euxina, n. sp., Dobrudscha, Clessin, (1) p. 55. *N. hieroglyphica*, n. sp., Hué, Cochinchina, Wattebled, p. 68, pl. iii, fig. 1. Notes on 5 Chinese species, Boettger (8). *N. funesta*, n. sp., New Guinea, Tapparone-Canefri, p. 12.

TURBINIDÆ.

Turbo is monographically treated by Sowerby (1); 138 species being described and figured; the novelties are: *T. cernicus*, n. n. = *T. japonicus*, Rv. (*pars*), Mauritius, p. 197, pl. iv, fig. 29; *T. bicolor*, n. sp., p. 198, pl. iv, fig. 33; *T. costulosus*, n. n. = *T. costulatus*, Gld. (*nec* Lmk.), and *T. latus*, Montrouzier (*nec* Phil.), p. 213, pl. xiii, fig. 161; *T. pagodulus*, n. n. = *T. aculeatus*, Rv. (*nec* Gm.), p. 220, pl. ix, fig. 100; *T. prevosti*, n. n. = *T. corolla*, Prev. MS. (*nec* Rv.), p. 222, pl. xii, fig. 134; *T. splendidus*, n. sp., hab. ?, p. 229, pl. xiv, fig. 180; *T. smithi*, n. sp., I. of Capul, p. 230, pl. xiv, fig. 182.

TROCHIDÆ.

Gibbula protumida, n. sp. (= *Trochus magus*, var.), France, Locard, (1) pp. 315 & 583.

Margarita umbilicalis, radula figured; Becher.

Solariella laevis, n. sp., North Sea, Friele, p. 30, pl. xii, figs. 4-6.

Trochus leaensis, Wats. = *T. (Gibbula) zonatus*, Wood; Watson, p. 76. *T. (Diloma) porcifer* (A. Ad.), from New Zealand; *id. t. c.* p. 67. *T. (G.) mariei*, n. sp., Comoro Is., Fischer, (2) p. 72, pl. i, fig. 5. *T. (Margarita) rhina*, n. n. = *T. lima*, Wats. (*nec* Phil.); *id. t. c.* p. 80. *T. (M.) streptophorus*, n. sp., Philippines, *id. t. c.* p. 91, pl. xvii, fig. 4. *T. (Minolia) semiustus*, Fischer, redescribed with fig.; Fischer, (2) p. 73, pl. i, fig. 6. *T. (Monilea) belcheri*, Phil., from Tongatabu; Watson, p. 71. *T. (Trochocochlea) colubrinus*, Gld., synonymy; *id. t. c.* pp. 65 & 66. *T. (Ziziphinus) stephanephorus*, n. sp., Philippines, *id. t. c.* p. 58, pl. xvii, fig. 1. *T. (Z.) tinctus*, n. sp., Bass Strait, *id. t. c.* p. 63, pl. xvii, fig. 2.

CYCLOSTREMATIDÆ.

Cyclostrema millipunctatum, *C. willi*, n. spp., North Sea, Friele, pp. 33 & 34, pl. xi, figs. 17-19; *C. excavatum*, W. Indies, *C. sulcatum*, *C. conicum*, Pernambuco, n. spp., Watson, pp. 121-123, pl. viii, figs. 10, 11, & 9.

STOMATIIDÆ.

Stomatella (Gena) caliginosa, H. & A. Ad., Culebra I., W. Indies; Watson, p. 111.

PLEUROTOMARIIDÆ.

Schismope tabulata, *S. lacuniformis*, W. Indies, *S. carinata*, Port Jackson, n. spp., Watson, pp. 116-119, pl. viii, figs. 7, 8, & 6.

Scissurella alta, W. Indies, Azores, *S. ædonia*, Pernambuco, Tristan da Cunha, *S. coronata*, Tahiti, *S. declinans*, N. Australia, *S. obliqua*, Kerguelen, n. spp., *id. t. c.* pp. 113-116, pl. viii, figs. 1-5.

FISSURELLIDÆ.

Propilidium acquitanense, n. sp., France, Locard, (1) pp. 346 & 584.

Puncturella noachina, L., includes *P. princeps*, Migh; Watson, p. 43.

ACMÆIDÆ.

Acmaea, Esch., has priority over *Tectura*, Aud. & M.-Edw.; Watson, p. 28.

POLYPLACOPHORA.

CHITONIDÆ.

Acanthopleura (?) incana (Gld.), probably includes *Chiton piceus*, Angas; Haddon, (1) p. 25.

Chiton murrayi, n. sp., Valparaiso, *id. t. c.* p. 21, pls. i, fig. 7, & iii, fig. 7.

Ischnochiton boogii, n. n., = *Chiton roseus*, Sow. (*nec* Blv.), Fernando Noronha; *id. t. c.* p. 15.

Lepidopleurus dorsuosus, n. sp., Prince Edward I., *id. t. c.* p. 18, pls. i, fig. 5, & iii, fig. 5.

Leptochiton benthus, n. sp., = *Chiton alveolus*, Watson, p. 719 (*nec* Sars), N. Pacific, 2300 fath.; *id. t. c.* p. 10, pls. i, fig. 1, & ii, fig. 1, *L. kerguelensis*, n. sp., Kerguelen I., *id. t. c.* p. 12, pls. i, fig. 3, & ii, fig. 3. *L. belknapi*, Dall, Philippines, figured; *id. t. c.* p. 10, pls. i, fig. 2, & ii, fig. 2.

Plaxiphora carpenteri, n. sp., Tristan da Cunha, *id. t. c.* p. 34, pls. i, fig. 8, & iii, fig. 8.

APLACOPHORA.

NEOMENIIDÆ.

Lepidomenia, n. g., Marion & Kowalewsky. Anatomy, see p. 31, *antea*.

SCAPHOPODA.

DENTALIIDÆ.

Cadulus. 11 species enumerated, with localities and notes; Watson, pp. 18-24. *C. carolinensis*, n. sp., 14-48 fath., Cape Hatteras, Bush, (2) p. 587.

Dentalium. 18 species, with localities and notes; Watson, pp. 1-13. *D. leptum*, n. sp., 14 fath., Cape Hatteras, Bush, (2) p. 586.

Siphodentalium. 8 species, with localities and notes; Watson, pp. 13-18.

PELECYPODA.

Fischer (1) has subdivided this class into *Tetrabanchia* and *Dibranchia*, and further into *Ostreacea*, *Pectinacea*, *Mytilacea*, *Arcacea*, and *Submytilacea*. His classification is adopted in the sequel.

OSTRACEA.

OSTREIDÆ.

Ostrea, artificial culture, see p. 61, *antea*.

PECTINACEA.

DIMYIDÆ.

Dimya argentea, W. Indies, Dall, (3) pp. 228-233, pl. iv, fig. 5.

LIMIDÆ.

Lima albicoma, n. sp., W. Indies, Dall, (3) p. 225.

Limæa bronmiana, n. sp., W. Indies, *id. t. c.* p. 226.

Limatula setifera, n. sp., W. Indies, *id. t. c.* p. 225.

PECTINIDÆ.

Æquipecten, n. subg. for *Pecten opercularis*, Fischer, (1) p. 944.

Amusium (*Propeamusium*) *pantalesianum*, n. n. for *A. lucidum*, Dall, 1881 (*nec* Jeffr.); Dall, (3) p. 211. *A. (P.) holmesii*, *A. (P.) sayanum*, n. spp., W. Indies, *id. t. c.* p. 214, pl. v, pp. 5, 11, 3, & 9.

Hinnites adamsi, n. sp., W. Indies, Dall, (3) p. 223, pl. v, fig. 6.

Pecten. Küster's monograph is continued by Kobelt (13), 28 species being described and figured, none new. *P. phrygium*, *P. effluens*, n. spp., W. Indies, Dall, (3) pp. 217 & 219. *P. aktinos*, n. sp., Tasmania, Petterd. *P. raffrayi*, n. sp., E. Africa, Ancy (1). *P. irradians*, fishery of, Ingersoll (2). *P. (Pseudamusium) reticulus* and *P. (P.) sigsbeeii* figured by Dall, (3) pls. v, figs. 8 & 10, & iv, fig. 2.

Plesiopecten, n. subg. for *Pecten subspinosus*, Schloth. ; Fischer, (1) p. 944.

MYTILACEA.

AVICULIDÆ.

Crenatula picta, Gm., = *C. phasianoptera*, Lmk., = *C. avicularis*, Lmk.; Cooke, (2) p. 138.

Isognomon nucleus, Lmk., numerous species synonymised with this ; *id. t. c.* p. 138.

Meleagrina muricata, Reeve. 8 species regarded as synonyms ; *id. t. c.* pp. 136 & 137. *M. margaritifera*, for parasites of, see p. 47, *antea*.

Mulletia, n. subg., for *Perna mulleti* ; Fischer, (1) p. 956.

Neocatillus, n. subg. for *Inoceramus lamarcki*, Brong. ; *id. t. c.* p. 958.

Vulsella. 3 species recognized (*V. lingulata*, *V. rugosa*, *V. spongiarum*), the remainder varieties ; complete list given with notes : Cooke, (1), see also *id.* (2) p. 137.

MYTILIDÆ.

Dreissensia cochleata, Kickx, living in the Amstel ; Pelseneer (1).

Lithodomus mayeri, n. n., = *L. deshayesi*, Mayor, 1861 (*nec* Dixon) ; Cossmann.

Modiola lamarckiana, *M. strangulata*, n. spp. (= *M. tulipa* varr.), France, Locard, (1) pp. 493 & 600. *M. fulgida*, H. Ad., = *M. philippinarum*, Haul. ; Cooke, (2) p. 140. *M. tulipa* found for first time north of S. Carolina ; Ford (1).

Modiolaria cœnobita, Vaill., = *M. marmorata*, Forbes ; Cooke, (2) p. 141.

Myoforceps, n. subg. for *Lithodomus caudigerus*, Lmk. ; Fischer, (1) p. 969.

Mytilopsis leucophata, Con., found 200 miles up St. John's River, in fresh water ; Wright, Couch. Exch. i, p. 27.

Mytilus petasunculinus, n. sp. (= *M. edulis* var.), France ; Locard, (1) pp. 497 & 601. *M. galloprovincialis*, distinctness of species defended against Jeffreys ; Brusina ; see also Kobelt (10). For poisonous mussels, *vide* p. 45, *antea*. For embryology see Wilson.

Tichogonia. Küster's monograph is continued by Kobelt (14) ; 25 species are described and figured, 1 being new, *T. (Septifer) siamensis*, Siam, p. 19, pl. xv, figs. 8 & 9 ; *T.* and *Septifer* are grouped together as placed by Küster, but Kobelt's opinion regarding the generic position of each species is indicated.

ARCACEA.

ARCIDÆ.

Arca kraussi, Phil., = *A. arabica*, Forsk. ; *A. setigera*, Reeve, = *A. lacera*, L. ; *A. striata*, Rv., = *A. lactea*, L. ; *A. pygmaea*, H. Ad., = *A.*

clathrata, Rv., juv.; *A. transversa* (*transversalis*), H. Ad., = *A. scapha*, Chemn.; Cooke, (2) pp. 92-95.

Limopsis cancellata, Rv., = *L. multistriata*, Forsk., juv.; Cooke, (2) p. 95.

NUCULIDÆ.

Nucula cymella, n. sp., W. Indies, Dall (3), p. 246.

SUBMYTILACEA.

UNIONIDÆ.

Anodonta henriquesi, p. 123, *A. paulinoi*, p. 125, *A. subregularis*, p. 127, *A. silvai*, p. 128, *A. giraldesi*, p. 130, *A. alleniana*, p. 131, *A. embiella*, p. 133, *A. bofilliana*, p. 134, *A. machadoiana*, p. 135, *A. capelloiana*, p. 136, *A. bocageana*, p. 138, *A. carvalhoi*, p. 140, *A. tamejana*, p. 141, *A. mengoiana*, p. 143, *A. barbosana*, p. 144, *A. specialis*, p. 145, *A. wenceslai*, p. 146, *A. rosai*, p. 148, *A. ribeiroiana*, p. 149, *A. lusoiana*, p. 151, n. spp., Portugal, Silva e Castro. *A. jourdyi*, n. sp., Tonkin, Morlet, (3) p. 76, and (4) p. 288, pl. xv, fig. 1. *A. mutabilis* var. *cellensis* in the Fedorsee, often forms pearls; Schlichter. *A. houghtonensis*, Currier n. sp., Michigan, DeCamp, p. 14, pl. i, fig. 2.

Margaritana freytagi, n. sp., Nassau, Kobelt (17).

Pharaonia, Bourguignat (Matériaux pour servir à l'hist. des *Moll.* acéph. du Syst. europ., 1880), created a genus. "Test mince, présentant une charnière formée de dents laterales lamelleuses, allongées, fines, qui sont séparées entre elles au niveau des crochets par une échancrure plus ou moins profonde"; includes *Unio essoensis*, Chaper; Jousseau, (1) p. 481. *P. bellamyi*, n. sp., Upper Senegal, *id. t. c.* pp. 486 & 487, pl. xii, fig. 7. *P. bourguignati*, n. sp., Congo, Rochebrune, p. 13.

Pteranodon, n. subg. for *Anodonta magnifica*, Lea; Fischer, (1) p. 1003.

Reneus, n. g. Small, with thin shell; surface adorned with concentric striae, and small granular fillets on the upper face of both extremities; hinge with long, slightly projecting lateral teeth, and lamellar cardinal teeth, whose direction coincides with that of the superior border. For *R. reneus*, n. sp., Upper Senegal; Jousseau, (1) pp. 481-483, pl. xii, fig. 4. Also includes *R. antiniloticus* (Bourg.), *R. backoyi*, *R. duponti*, *R. mandinguorum* (Rochebr.), *R. faidherbiei* and *R. fouladongonensis*, n. spp., *id. t. c.* pp. 483-486, pl. xii, figs. 5 & 6.

Spatha bellamyi, *S. renei*, *S. rochebrunei*, *S. mabillei*, *S. tristis*, n. spp., Upper Senegal, *id. t. c.* pp. 491-498, pls. xiii, fig. 2 & 3, & xiv, figs. 1-3. *S. corneola*, *S. ganciniensis*, n. spp., Congo, Rochebrune, p. 9.

Spathella protchei, n. sp., Congo, *id. t. c.* p. 8. *S. adansonii*, n. sp., Upper Senegal, Jousseau, (1) pp. 498-500, pl. xiv, fig. 4.

Unio heldreichi, n. sp., Thessaly, Boettger, (6) p. 71. *U. jourdyi*, *U. micheloti*, n. spp., Tonkin, Morlet, (3) pp. 76 & 77, and (4) pp. 289, 291, pl. xiii, figs. 5 & 6. *U. coreanus*, n. sp., Corea, Martens (2). *U. schwein-furthi*, n. sp., Egypt, *id.* (4) p. 127. *U. jouberti*, p. 8, *U. charbonnieri*, p. 9,

U. moineti, p. 11, *U. coulboisi*, p. 12, *U. bridouxi*, p. 13, *U. lavigerianus*, p. 14, *U. guillemeti*, p. 15, *U. dromauxi*, p. 17, *U. vinckei*, p. 18, *U. josseti*, p. 19, *U. menardi*, p. 20, *U. visseri*, p. 21, *U. randabeli*, p. 22, n. spp., Tanganika, Bourguignat (1). *U. dorri*, n. sp., Hué, Cochin China, Wattebled, p. 71, pl. v, fig. 5. *U. jolyi*, *U. medjerdæ*, *U. micelii*, *U. serbicus*, *U. croaticus*, *U. decipiens*, *U. gandioni*, *U. striatulus*, *U. nitidosus*, *U. truncatulus*, *U. neocomiensis*, figured for the first time; Kobelt (15). *U. rhenanus*, *U. kochii*, n. spp., Nassau, *id.* (17). *U. popenoi*, n. sp., Kansas, Call (2). 33 species from Ohio; Sterki, pp. 24, 25, & 54-56. Pohlig by the examination of a large series from the Rhine, has reduced a number of species and varieties to two—*U. pictorum* and *U. batavus*. *U. (Hyridella) hygapanus*, *U. (H.) fissidens*, n. spp., Kalahari Desert, Böttger, (11) pp. 26-28, pl. ii, figs. 6 & 7.

Zairia, n. g., for *Z. disciformis*, *Z. araneosa*, *Z. poirieri*, *Z. elegans*, *Z. sordida*, n. spp., Congo, Rochebrune, pp. 10-13.

MUTELIDÆ.

Family justified on anatomical grounds; Pelseneer, (4) p. 127.

Chelidonura, n. g. for *Spatha (Mutela) hirundo*, v. Marts. (pl. i, figs. 5 & 6); and also *C. arietina*, n. sp., Congo, Rochebrune, pp. 3-5, pl. i, figs. 1-4.

Mutela bridouxi, p. 25, *M. lavigeriana*, p. 26, *M. moineti*, p. 27, *M. jouberti*, p. 28, *M. monceti*, p. 29, *M. visseri*, p. 31, n. spp., Tanganika, Bourguignat (1).

Mutelina, n. g., Bourguignat (41), Zool. Rec. xxii, *Moll.* p. 3. *M. legumen*, *M. tholloni*, *M. prasina*, *M. mabilli*, *M. paludicola*, n. spp., Congo, Rochebrune, pp. 6-8. *M. complanata*, n. sp., Upper Senegal, Jousseaume, (1) p. 489, pl. xiii, fig. 1.

Pliodon, anatomy, see p. 31, *antea*.

IRIDINIDÆ.

Brazzea ventricosa, p. 45, *B. randabeli*, p. 46, *B. moineti*, p. 47, *B. jouberti*, p. 48, *B. coulboisi*, p. 50, *B. elongata*, p. 51, *B. charbonnieri*, p. 52, *C. lavigeriana*, p. 53, *B. bridouxi*, p. 54, *B. newcombiana*, p. 55, *B. eximia*, p. 57, *B. bourguignati*, p. 58, n. spp., Tanganika, Bourguignat (1).

Burtonia moineti, p. 33, *B. elongata*, p. 34, *B. subtriangularis*, p. 35, *B. lavigeriana*, p. 36, *B. bridouxi*, p. 37, *B. bourguignati*, p. 38, *B. contorta*, p. 39, *B. jouberti*, p. 40, *B. magnifica*, p. 41, *B. grandidieriana*, p. 42, n. spp., Tanganika, Bourguignat (1).

Cameronia, Bgt., is based upon hinge characters, which vary in different individuals; Pelseneer, (4) p. 111.

Cameronia gigantea, p. 68, *C. admirabilis*, p. 69, *C. bridouxi*, p. 71, *C. guillemeti*, p. 72, *C. pulchella*, p. 73, *C. landeui*, p. 74, *C. obtusa*, p. 75, *C. complanata*, p. 76, *C. coulboisi*, p. 77, *C. locardiana*, p. 78, *C. revoiliana*, p. 79, *C. wynckei*, p. 81, *C. josseti*, p. 82, *C. charbonnieri*, p. 83, *C. dromauxi*, p. 84, *C. lavigeriana*, p. 85, *C. mabilliana*, p. 86, *C. jouberti*, p. 88,

C. moineti, p. 89, *C. randabeli*, p. 90, *C. paradoxa*, p. 91, n. spp., Tanganika, Bourguignat (1).

Moncetia lavigeriana, p. 60, *M. moineti*, p. 61, *M. rochebruniana*, p. 62, *M. jouberti*, p. 63, *M. bridouxii*, p. 65, n. spp., Tanganika, Bourguignat (1).

ÆTHERIIDÆ.

Ætheria bourguignati, n. sp., Congo, Rochebrune, p. 14.

CARDITIDÆ.

Cardita laxa, n. sp., France, Locard, (1) pp. 457 & 598.

ASTARTIDÆ.

Astarte smithii, n. sp., West Indies, Dall, (3) p. 259, pl. vii, fig. 5. *A. borealis*, n. var. *crassa*, Kara Sea, Pfeffer, p. 11, figs. 2, 3a, b, 4.

CRASSATELLIDÆ.

Crassatella: monograph of genus completed by Kobelt & Löbbecke; 48 species, the following new:—*C. loebbeckei*, p. 18, *C. simplex*, hab.?, p. 24, *C. sublamellata*, Japan, p. 25, *C. adamsi*, n. n. (= *C. compressa*, Ad. & Rv.), p. 26; *C. acuminata*, Singapore, p. 29, *C. fusca*, Senegambia, p. 30: all figured.

KELLYELLIDÆ.

Turtonia, F. & H., distinct from *Cyamium*, Phil.; Smith (2).

CARDIACEA.

CARDIIDÆ.

Cardium ceramidum, n. sp., West Indies, Dall, (3) p. 269, pl. iv, fig. 6. *C. obtritum*, n. sp. (= *C. edule*, pars.), France, Locard, (1) pp. 451 & 598.

CHAMACEA.

CHAMIDÆ.

Chama lactuca, n. sp., West Indies, Dall, (3) p. 268. *C. cornucopia*, Rv., includes *C. foliacea*, Quoy, *C. reflexa*, Rv., and *C. rüppellii*, Rv.; Cooke, (2) p. 96.

CONCHACEA.

CYPRINIDÆ.

Callocardia (Vesicomya) venusta, n. sp., West Indies, Dall, (3) p. 274. *Coralliophaga striolata*, H. Ad. = *C. coralliophaga*, Gmel.; Cooke, (2) p. 103.

Eucharis, Recluz, defended as a valid genus, and not synonymous with *Poromya*, but as including *Anisodonta* (*pars*), Desh., 1863, and *Basterotia*, Hoernes, 1870 : 10 recent and 2 fossil forms described, with notes and figures ; Fischer (3).

Meiocardia agassizii, n. sp., West Indies, Dall, (3) p. 271.

Vesicomya, n. subg. "Shell small, smooth, or concentrically striate ; hinge of *Meiocardia*, but without lateral teeth ; epidermis polished, umbones moderately prominent ; lunule circumscribed by a groove ; otherwise as in *Meiocardia*." For *Callocardia atlantica*, Smith ; *id. t. c.* p. 272.

VENERIDÆ.

Circe crocea, Gray = *C. corrugata*, Chem., var. ; *C. lentiginosa*, Chem. ; *C. semiarata*, Dunk., and *C. pulchra*, Desh. = *C. arabica*, Chem. ; Cooke, (2) p. 100.

Cytherea (*Veneriglossa*) *vesica*, n. sp., West Indies, Dall, (3) p. 275.

Dosinia rissoiana, *D. inflata* (= *D. linctus*, *pars*), n. spp., France, Locard, (1) pp. 427 & 594.

Tapes extensus, *T. reconditus*, n. spp. (= *T. pullastra*, *pars*), France, *id. t. c.* pp. 435 & 595. The French species are monographically treated, *id.* (3) : 26 forms are allowed, and the following appear as new :—*T. mabillei*, n. n., = *T. texturatus*, Hidalgo (*nec* Lmk.) p. 270, *T. rostratus*, p. 274, *T. grangeri*, p. 276, *T. rochebrunei*, n. n., = *T. bicolor*, Loc. (*nec* Lmk.), p. 278, *T. bourguignati*, n. n., = *T. petalinus*, Rv. (*nec* Lmk.), p. 285, *T. anthemodus*, n. n., = *T. floridus*, auct. (*nec* Poli), p. 290, *T. lucens*, n. n., = *T. nitens*, Scacchi & Phil. (*nec* Turton), p. 298, *T. retortus* = *T. aureus*, Hidalgo, p. 304, *T. servaini*, p. 309, *T. lepidulus* = *T. virgineus*, Jeffer., p. 317 : all figured.

Venerupis quadrasi, n. sp., Philippines, Hidalgo, (3) p. 155, pl. viii, fig. 8. *V. macrophylla*, Desh., = *V. irus*, L. ; Cooke, (2) p. 103.

PETRICOLIDÆ.

Petricola lithophaga, Retz., includes *P. hemprichii*, Issel, and (?) *P. chinensis* and *P. bipartita*, Desh. ; Cooke, (2) p. 104.

CYRENIDÆ.

Batissa finschi, *B. angulata*, n. spp., New Guinea, Reinhardt, (2) pp. 61 & 62.

Corbicula annamitica, *C. souverbiana*, n. spp., Hué, Cochin China, Wattebled, pp. 69 & 70, pl. v, figs. 3 & 4. *C. tonkiniana*, *C. baudoni*, *C. petiti*, n. spp., Tonkin, Morlet, (4) pp. 268, 292, & 294, pl. xiv, figs. 5 & 6. *C. obtruncata*, Ning-kono-fou ; *C. adunca*, Kieng-ping-hien ; *C. gentiliana*, Fou-kien ; *C. bezauriana*, Fou-kien ; *C. foukiensis*, Fou-kien, pl. i, figs. 2-6 ; *C. astronomica*, Shanghai ; *C. cordieriana*, Kouenchan ; *C. bicolor*, Kouenchan ; *C. teleciana*, Nanking ; *C. diminuta*, Nanking ; *C. aquilina*, Nanking ; *C. uncinulata*, Liyang, pl. ii ; *C. colombeliana*, Liyang ; *C. vicina*,

Lu-tchew-fou ; *C. cornica*, Kien-ping-hien ; *C. porcellanea*, Ning-kono-fou, pl. iii ; *C. concinna*, Ning-kono-fou ; *C. ingloriosa*, Kieng-ping-hien ; *C. gravis*, Kien-ping-hien ; *C. indigotina*, King-hien ; *C. rathouisiana*, *C. derbriziana*, Ning-kono-hien, pl. iv ; *C. fenouilliana*, Yun-nan ; *C. scholastica*, Suen-tehen ; *C. montana*, Tai-ping-fou ; *C. cheniana*, Quang-te-tchew ; *C. gryphaea*, Fan-chang ; *C. polychromatica*, Tsing-yang ; *C. lapicida*, Tong-hien, pl. v ; *C. portentosa*, Kien-té ; *C. ignobilis*, Peng-tse-hien ; *C. bilineata*, Tong-lieou ; *C. grilloana*, Tche-tchew-fou ; *C. papyracea*, Koué-tche-hien, pl. vi ; *C. cantatoris*, Kien-té-hien ; *C. sphaerica*, Kien-té-hien ; *C. ferruginea*, Tsing-yang ; *C. iridinea*, Tsing-yang ; *C. præterita*, Po-yang ; *C. aurea*, Hunan ; *C. presseplicata*, Ho-fé, pl. vii ; *C. squalida*, Tong-lieou ; *C. variegata*, Middle Houai ; *C. subquadrata*, Middle Houai ; *C. iodina*, Middle Houai ; *C. fluitans*, Upper Houai ; *C. borealis*, Fan-tcheng ; *C. soriniana*, Kwang-tong ; *C. delavayana*, Kwang-tong, pl. viii : Heude (2).

Psidium liljeborgii and *P. hoyeri*, Clessin, n. spp., Norway, Esmark & Hoyer, pp. 119 & 120.

UNGULINIDÆ.

Cryptodon pyriformis, n. sp. (? = *C. obesus*, Vll.), W. Indies ; Dall, (3) p. 267.

DONACIDÆ.

Donax cycloides, n. n., = *D. ovalina*, Cossmann, 1885 ; *D. bezanconi*, Cossmann, 1883, = *Cyrena acutangularis*, Desh. : Cossmann.

SOLENIIDÆ.

Solen plagiular, n. n., = *S. obliquus*, Sow. (*nec* Spengler) ; Cossmann.

MYACEA.

MYIDÆ.

Corbula curta, n. sp. (= *C. nucleus* var. F. & H.), France, Locard, (1) pp. 387 & 588.

Mya elongata, n. sp., France, *id. t. c.* pp. 383 & 586.

ADESMACEA.

PHOLADIDÆ.

Xylophaga abyssorum, n. sp., W. Indies, Dall, (3) p. 317, pl. ix, fig. 7.

TEREDINIDÆ.

Teredo. Popular account by Stearns. Another, mainly quoted from Verrill ; Ingersoll, pp. 704 & 705.

LUCINACEA.

LUCINIDÆ.

Lucina sombreroensis, *L. leucocyma*, *L. sagrinata*, n. spp., W. Indies, Dall, (3) pp. 264 & 265. *L. globosa*, Forsk., = *L. pila* and *L. tumida*, Rv.; Cooke, (2) p. 99.

TELLINACEA.

TELLINIDÆ.

Ashjörnsenia, n. g.: shell oval, inequilateral, has in the right valve a central cardinal tooth, and in the left valve a double one, at whose base a small indistinct secondary tooth is placed; for *A. striata*, n. sp., North Sea, Friele, pp. 36 & 37, pl. xii, fig. 14.

Tellina bourguignati, n. sp. (= *T. tenuis*, pars), France; Locard, (1) pp. 423 & 593. *T. neustriaca*, n. sp., France; *id. t. c.* pp. 424 & 594. *T. exculpta*, Gld., = *T. crucigera*, Lmk.; *T. woodii*, Desh., = *T. sulcata*, Wood; *T. silicula*, Desh., = *T. rhomboides*, Quoy; *T. isseli*, H. Ad., = *T. balaustina*, Poli; *T. slavigni*, H. Ad., = *T. pinguis*, Hanl.; *T. rosacea*, H. Ad., = *T. triradiata*, H. Ad. *juv.*; *T. erythraensis*, H. Ad., = *T. rhomboides*, Quoy; Cooke, (2) pp. 105-107.

SCROBICULARIIDÆ.

Syndosmya brachyrhyncha, n. n., = *Ligula brevis*; Cossmann.

ANATINACEA.

CUSPIDARIIDÆ.

Myonera laticella, n. sp., W. Indies, Dall, (3) p. 305.

Neara costata, n. sp., 48 fath., Cape Hatteras; Bush, (2) p. 587. Probable absence of gills; Dall (4).

Vulcanomya, n. g. for *Neara adunca*, Smith, 1885 (*nec* Gould); *id.*, (3) p. 299.

VERTICORDIIDÆ.

Haliris, n. subg. "Shell globose, ossicle short, squarish; lunule present, not deep; right valve with hinge teeth as in *Trigonulina*; left valve with (in the adult) a small but distinct cardinal tooth and a short stout lateral tooth near the umbo; lunule not produced;" for *Verticordia fisheriana*, Dall, (3) p. 287.

ANATINIDÆ.

Asthenotharus hemphillii, n. sp., W. Indies, Dall, (3), p. 309.

Bushia, n. subg. "Shell inequivalve, inequilateral, truncated behind, but not gaping; porcellaneous; concentrically sculptured; hinge tooth-

less, with a large U-shaped ossiculum fitting in the apices of the beaks, which are filled with solid shelly matter ; a strong external ligament, but for which the hinge line is not bent or thickened ;" for *B. elegans*, n. sp., W. Indies, *id. t. c.* p. 309.

Cetoconcha, n. sect. "Shell differing from *Poromya* proper by the cartilage being almost external and the fossettes diminished in size and upturned, the external ligament consequently nearly obsolete ;" for *Lyonsia bulla*, Dall ; contains also *Pecchiolia tornata*, Jeffr., *Thracia nitida*, Verrill : *id. t. c.* p. 280.

Poromya (Cetoconcha) albida, *P. (C.) elongata*, *P. (C.) margarita*, n. spp., W. Indies, *id. t. c.* pp. 282 & 284.

Thracia crassa, n. sp., Jan Mayen, Becher, p. 71, fig. 1 ; *T. stimpsoni*, n. sp., W. Indies, Dall, (3) p. 307.

ADDENDA.

To Section 5, *Respiratory System*, p. 33, add, "Possible absence of gills in *Neæra* ; DALL (5)."

To Section 11, *Stray Biological Notes*, pp. 45-47, add,—

"*Zonites draparnaldi*, kept for some years and fed in winter on meat in lieu of vegetables ; did not thrive ; HELE (1)

"*Leucochroa*, sp., and *Helix vermiculata*, Müll., alive after two years' confinement in a leaden case ; REINHARDT (1)."

BRACHIOPODA.

BY

WILLIAM E. HOYLE, M.A., F.R.S.E.

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- CRANE, AGNES. On a Brachiopod of the Genus *Atretia*, named in MS. by the late Dr. T. Davidson. P. Z. S. 1886, pp. 181-184.
- DALL, W. H. (1) Report on the *Mollusca* collected by L. M. Turner at Ungava Bay, North Labrador, and from the Adjacent Arctic Seas. P. U. S. Nat. Mus. ix, pp. 202-208.
- . (2) Contributions to the Natural History of the Commander Islands. No. 6.—Report on Bering Island *Mollusca* collected by Mr. Nicholas Grebnitzki. T. c. pp. 209-219.
- . (3) Reports on the Results of Dredging, under the Supervision of Alexander Agassiz, in the Gulf of Mexico (1877-78) and in the Caribbean Sea (1879-80), by the U.S. Coast Survey Steamer 'Blake,' Lieut-Commander C. D. Sigsbee, U.S.N., and Commander J. R. Bartlett, U.S.N., Commanding. xxix. Report on the *Mollusca*.—Part i, *Brachiopoda* and *Pelecypoda*. Bull. Mus. C. Z. xii, pp. 171-318, pls. i-ix. [*Brachiopoda*, pp. 187, 188, & 199-205.]
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- [DAVIDSON, T.] (2) On a living Spinose *Rhynchonella* from Japan. Ann. N. H. (5) xvii, pp. 1-3, cut; abstr. J. R. Micr. Soc. (2) vi, p. 229.
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- (2) Note on the recently proposed Genus *Billingsia*. *Op. cit.* xxxii, p. 325.
- FRIELE, H. *Mollusca* II. Den Norske Nordhavs-Expedition 1876-78. XVI. Zoologi, 44 pp., pls. vii-xii. Christiania : 1886, 4to. [*Brachiopoda*, p. 39.]
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- VIGELIUS, W. J. [*Vide* KOBELT, *supra*.]
- WHITFIELD, R. P. *Brachiopoda* and *Lamellibranchiata* of the Raritan Clays and Greensand Marls of New Jersey. 270 pp., 35 pl. Geol. Survey New Jersey. Trenton : 1886, 4to. [*Brachiopoda*, pp. 5-15.]

GENERAL AND ANATOMICAL.

DAVIDSON gives a monographic account of the recent *Brachiopoda* as far as the end of the genus *Waldheimia*. No new species are described,

but full references are given, and many quotations from anatomical works. The classification adopted is as follows :—

ARTHROPODATA, Owen, = <i>Cis tentatoria</i> , King.					
	Subfamily.	Genus.	Species.	Uncertain species.	
	TEREBRATULINÆ . {	i <i>Lithyris</i> , Douville	8	2	
		ii Subg. <i>Terebratulina</i> , d'Orbigny	10	5	
		iii <i>Waltheimia</i> , King	10	1	
	TEREBRATELLINÆ . {	iv <i>Terebratella</i> , d'Orbigny	9	3	
		v Subg. <i>Magasella</i> , Dall	6	6	
	MEGERLINÆ . {	vi <i>Megerlia</i> , King	2	1	
		vii Subg. <i>Laqueus</i> , Dall	3		
1. TEREBRATULIDÆ .	MAGASINÆ . {	viii <i>Bouchardia</i> Davidson	1		
		ix <i>Kraussina</i> , Davidson	5		
	KRAUSSININÆ . {	x Subg. <i>Megerlina</i> , Deslongchamps	2		
		xi <i>Argiope</i> , Deslongchamps	1	2?	
	ARGIOPINÆ . {	xii Subg. <i>Cistella</i> , Gray	8	1	
		xiii ? <i>Gargnia</i> , King	1		
	Not yet determined {	xiv <i>Platydia</i> , Costa	2		
2. THECIDIIDÆ .		xv <i>Thecidium</i> , DeFrance	2		
3. RHYNCHONELLIDÆ .		xvi <i>Rhynchonella</i> , Fischer	6		
	{	xvii Subg. <i>Atreria</i> , Jeffreys	2		
 LYOPOMATA, Owen, = <i>Tretentorula</i> , King.					
4. CRANIIDÆ .		xviii <i>Crania</i> , Retzius	4	1	
5. DISCINIIDÆ .	{	xix <i>Discina</i> , Lamarck	1		
	xx Subg. <i>Discinissa</i> , Dall		6	1	
6. LINGULIDÆ .	{	xxi <i>Lingula</i> , Bruguinière	8	3	
	xxii Subg. <i>Glottidia</i> , Dall		3	2	

DAVIDSON's monograph of the British fossil *Brachiopoda* is completed by the issue of vol. vi, containing the bibliography. [See DAVIDSON & DALTON.]

Differences in structure between the lower and upper valves are detailed. In *Crania* the shell is tunnelled by canals invested by a plexus

of cells derived from the outer layer of the mantle. This last consists of a cartilaginous lamella covered with cells on either side and containing the reproductive organs in its folds. It serves also as an organ of reproduction. The arms are formed of cartilaginous material, and are penetrated by two canals, one of which sends branches to the cirri; the canals also form a plexus round the œsophagus and communicate by two small openings with the cœlom. There are eleven muscles, the most important being the adductors and protractors and those which fix the arms. The anus is in the middle line of the body, and slightly dorsal; the alimentary canal is ciliated internally; the liver is simply cellular, and has a delicate sheath of cartilaginous tissue, wanting in *Discina* and *Lingula*. Proper circulatory and respiratory organs are absent. The sexes are separate; the ovaries are modified cœlomic epithelium with a connective tissue plexus. There is an œsophageal nerve-collar, from the dorsal swelling of which the brachial nerves proceed, the mantle, viscera, and muscles being supplied by the sub-œsophageal portion. The general relations of the group are discussed; JOUBIN.

The shell of *Lingula pyramidata* consists of horny and calcareous layers alternately; a cuticle is continued over the whole surface of the shells and the peduncle, below which, as also in other parts of the shell, are clusters of small homogeneous corpuscles, probably homologous with those in the vertical septa of the *Testicardines*. The horny layers are produced into the peduncle as a "supporting lamella." The cuticle is probably a modified larval integument, and the shell contains in all parts processes of the cœlom. The body-wall, mantle, and peduncle all consist of epithelium, both ectodermal and peritoneal, and supporting tissue. The character of the ectoderm varies in different parts of the body, being furnished in certain regions with oval structures like taste-bulbs. Immediately below the ectoderm is a supporting substance, the central nervous system intervening in certain places; where this is the case spindle-shaped nucleated cells occur. The supporting tissue also contains certain calcareous plates comparable with those found in the *Testicardines*. In the peduncle the supporting lamella becomes a net-work enclosing bundles of spermatozoa. Many structures previously regarded as muscular have no claim to this designation. No pulsating organ was found; four kinds of corpuscles found in the cœlomic fluid are described. The interior of the alimentary canal is ciliated, and from the stomach hepatic cœca are given off. The nervous system recalls that of *Waldheimia*; there are five ganglia—one sub-œsophageal, two ventro-lateral, and two supra-œsophageal—which are united by connectives and commissures. The cord between the ventro-lateral and supra-œsophageal ganglia gives off pallial nerves and passes along the base of the arms, which are themselves supplied by the supra-œsophageal ganglia. The existence of Schulgin's sensory cells is doubtful. *Lingula* is hermaphrodite, but the two kinds of sexual elements are not developed at the same time. The genital products are derived from the cœlomic epithelium in the mantle; in the visceral chambers the ovaries occupy the mesenteric bands, the spermatozoa the peripheral walls. The segmental organ appears to act as sperm-duct as well as oviduct; BEYER.

BEYER (2) describes sections of the so-called "hearts" of *Lingula* ("segmental organs" of Morse), and finds the internal end of them in connection with a diverticulum of the alimentary canal, which may, however, be pathological.

Preservation of *Brachiopoda*; NOLL, p. 32.

GEOGRAPHICAL DISTRIBUTION.

Jan Mayen. *Rhynchonella psittacea*; BECHER. *Terebratula (Liothyris) arctica*; FRIELE, p. 391.

Irish Coast. *Terebratulina caput-serpentis*, L., *Crania anomala*, MÜLL.; SWANSTON.

Channel Is. *Argiope capsula*, Jeffr.; KÖHLER, p. 58.

Labrador. *Rhynchonella psittacea*; DALL, (1) p. 208.

United States. 6 species (none new) from Cretaceous deposits; WHITFIELD.

Western Atlantic. *Terebratulina septentrionalis*; BUSH, p. 724. *Waldheimia cranium* (Müll.) and *Discina atlantica*, King; VERRILL, p. 578.

W. Indies. 13 species recorded, with descriptions and notes, by DALL (3).

China Sea and Japan. 32 species enumerated by DAVIDSON, (1) p. 33. *Rhynchonella döderleini*, n. sp.; *id.* (2).

New South Wales. *Atrétia brazieri*; CRANE.

ARTHROPOMATA.

TEREBRATULIDÆ.

Megerlia incerta, Dav., referred to *Terebratula*; DALL, (3) p. 201, pl. vi, fig. 6.

Terebratula bartletti, DALL, and *T. incerta (Megerlia)*, Davidson, figured; *id. t. c.* pp. 200-202, pl. vi, figs. 4 & 6. *T. (Liothyris) arctica*, Fr., Jan Mayen; FRIELE, p. 39, pl. xii, figs. 17 & 18.

Terebratulina septentrionalis (Couth.), 16-396 fath., off U.S. coast; BUSH, p. 724, and VERRILL, p. 578. *T. caput-serpentis*, L., coast of Ireland, 38-48 fath.; SWANSTON.

Waldheimia cranium (Müll.), 1362 fath., U.S. coast; VERRILL, p. 578.

RHYNCHONELLIDÆ.

Atrétia brazieri, n. sp., Port Stephens, New South Wales, CRANE.

Rhynchonella döderleini, n. sp., Sagami Bay, Japan, Davidson (2). *R. psittacea*, Jan Mayen, Becher, p. 68; N. Labrador, DALL, (2) p. 208.

LYOPOMATA.

CRANIIDÆ.

Crania anomala, Müll., coast of Ireland, 38-54 fath.; SWANSTON.

DISCINIDÆ.

Discina atlantica, King, 1251-1467 fath., U.S. coast; Verrill, p. 578.

OBOLIDÆ.

Billingsia, n. g., near *Obolella*, but differing in the central pair of muscular impressions, and in the presence of a spoon-shaped cavity beneath the rostrum. For *Obolella desiderata*, Billings, Lower Silurian, Canada; Ford (1).

Elkania, n. n. for *Billingsia*, preocc.; Ford (2).

POLYZOA.

BY

WILLIAM E. HOYLE, M.A., F.R.S.E.

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GENERAL AND ANATOMICAL.

VINE's Report is a compilation of all available material regarding the systematic arrangement and distribution of recent *Polyzoa*. After introductory observations explaining the terminology, the classifications of Busk & Hincks are given; then an alphabetical list of families, genera, and species. Then follows a systematic list in which the families and genera are defined. Lists of synonyms, with the adopted names, are added, from Hincks & Busk. Geographical and bathymetrical distribution are fully treated, lists being given of forms from the different regions of the globe. Abstracts are given of several published papers and a bibliography.

In the marine *Ectoprocta* the vegetative end of a stolon consists of homogeneous indifferent tissue; in most cases this differentiates into the parietal endocyst, which continues to thicken, and the central endocyst, which always maintains its vitality and remains indifferent. In some cases this differentiation does not take place. When, however, it is complete, an ectodermal tissue is enclosed in a pouch composed both of endoderm and mesoderm, in the centre of which a small mass of shells, the future intestine, becomes isolated. As soon as the polypide has appeared in the zoecium various organs are formed. "The tentacles, with their flagellate epithelial cells, and the epithelium of the lophophore and of the œsophagus, no doubt represent the ectoderm. The tentacular sheath consists internally of a layer of delicate flattened cells, which appear to be ectodermal. The parietal endocyst, differentiated and specialized as it is in *Flustra*, may be regarded as forming an outer skin, or somewhat more definite ectoderm. All the parts in the zoecium, which are contained between the outer skin and the intestinal epithelium, with the internal epithelium of the tentacular sheath, form the mesoderm and the general cavity;" JOLIET.

The rudiment of a digestive canal observed by M. Joliet is merely a mass of lymphatic cells, comparable with the lymphoid cells of Annelids described by Kukenthal. The figures of Nitsche are defended against certain criticisms of the former author; OSTROUMOFF (4).

The *Cheilostomata* are distinguished as calcareous, with a typically tetragonal zoecium, a semicircular operculum, and spicules, which probably increase their respiratory surface. Their zoecial skeleton has pores of communication on either the basilar or lateral surfaces. The *Ctenostomata* are chitinous and have no operculum. Two varieties of ovicells are distinguished:—(1) Those consisting of a whole zoecium modified except the digestive tract; (2) those which occur as organs on certain zoecia. The ectoderm lies below a cuticle; as development proceeds the protoplasm gathers round the nuclei, producing a reticulate appearance. The ectoderm gives rise to the epithelium of the tentacular

sheath, the stomodæum, proctodæum, superior cells of the tentacles, and the ganglia. The endoderm produces the mesenteron, and with it the brown mass is associated; this is probably a stomachic cæcum, modified and containing a quantity of detritus. The mesodermic cells may be described as funicular. The muscles are divided histologically into three groups, which are described. The reproductive organs are mesodermic; their products are discharged into the cavity of the zoecium, and thence into the tentacular sheath. Three types of larvæ are distinguished and described. (1) The calcareous skeleton of the *Bryozoa* is deposited between the cells of the ectoderm, which exists throughout the life of the zoecium, and presents the appearance sometimes of a single layer under the skeleton (*Membranipora*), sometimes of a double layer enclosing the skeleton (*Lepralia*). (2) The cavity of the body presents mesenchymatous products, according to Hertwig's classification, and has never any endothelial covering. (3) In the *Cheilostomata* the sucker forms the basal wall of the zoecium, and produces the stolon in *Vesicularia*. The new members of the colony are only formed by budding upon these derivatives of the sucker (except in the case of the opercular avicularia of *Cellularia* and *Escharella*). (4) The polypide is formed at the expense of the ectodermal rudiment and of the brown body. At the commencement of its embryonic period the larva still presents a special organ, designated as "calotte," and destined to form this rudiment; OSTROUMOFF (4).

The ovary of *Bugula calathus* is attached to the neural wall of the sexual individual; a struggle for existence takes place among the ova, which are thus reduced to one, or (rarely) to two. The ovary then becomes free, a follicular remnant forming the germ of a new ovary. The egg, now independent, passes neuralwards to the ovicell; fertilization is probably internal. The brood capsule arises as two diverticula from the distal wall; these grow together, and enclose a space within which development occurs; a layer of peculiar cells is found where the embryo is attached; muscles are also present. *Segmentation* takes place first in the short axis, the next plane is also meridional, the third equatorial; then two planes appear parallel to the first, and two others to the second. At this stage four cells may be seen within the blastocæl—the rudimentary *endoderm*—which are probably introduced by epibole. They increase in number and form also the *mesoderm*; cavities are developed in this mass of cells, and give rise to the cælom. An equatorial annular thickening takes place, giving rise to the ciliated corona; and two invaginations take place on the oral surface, one of which is the suctorial pit, for the attachment of the larva. The second invagination is not the mouth, though often called so; it may be termed "anterior ectodermic groove." At the aboral pole a thick flattened disc intrudes for some distance into the anterior of the embryo; a circular invagination surrounds this, and a pear-shaped organ results, regarded as a gland. When ready for metamorphosis, the larvæ swim round and round, and from place to place, during which motions the discoid organ is protruded. The attachment, however, does not take place by means of this, but by the oral pole; the aboral side of the larva enlarges, and almost all the dermal

surface of the primary animal arises from it. The larvæ are not specially attracted by light. The discoid organ, ectodermal groove, and gland are withdrawn into the interior; as also the flagella and cilia. The view of Barrois that the development is not a metagenesis, but a true metamorphosis, is supported; VIGELIUS (2).

The larvæ of the *Cyclostomata* are the simplest among the marine *Polyzoa*. Their whole surface is ciliated; there is a sucker at one pole, at the other the mantle cavity. The entodermal cavity disappears before the extrusion of the larva; there are no provisional organs. The metamorphosis begins with the protrusion of the basal wall of the primary zoecium and with the flexion of the mantle. The basal wall widens and forms a kind of stolo prolifer ("lame germinale," d'Orb.). The ectoderm of the polypide is formed of a plate split off from the ectodermal cells. The process recalls that which occurs in the *Vesicularia*. The *Incrustata* and *Stolonifera* unite the *Cyclostomata* and *Ctenostomata*; OSTROOUMOFF (2).

In the larvæ of freshwater *Polyzoa* the posterior ectodermal cells are much higher than those of the rest of the body, being possibly homologous with the sucker of marine *Ectoprocta*. The metamorphosis of *Alcyonella* is divisible into two stages:—(1) The mantle bends over on the basal side; this is common to all *Ectoprocta*. (2) In the freshwater forms only the basal side and edges of the mantle are invaginated, so that the ascending portion of the mantle-cavity forms a canal, the walls of which soon fuse, and from which the body-wall of the primary zoecium is alone developed; OSTROOUMOFF (3).

The post-larval changes in *Pedicellina* consist in a remarkable metamorphosis, and the first bud is formed after the primary individual is adult. The metamorphosis is perhaps an abbreviation of some more archaic process. The growing point of a stolon seems to consist only of ectoderm and cuticle, enclosing structureless jelly and connective tissue corpuscles: the brown bodies are regarded as degenerate polypides; the degenerative process is too slight to give rise to them in *Pedicellina*; HARMER.

As the result of studies of the development of *Lepralia*, *Bugula*, *Serialaria*, and *Pedicellina*, full details regarding which are given, the following conclusions are formulated:—Two chief typical modes of metamorphosis may be distinguished—that of *Phoronis* and that of *Pedicellina*. The former is characterized by the predominance of the ventral surface, which forms the bulk of the body, and the reduction of the dorsal surface to a terminal region; the second by the predominance of the aboral surface (cephalic aspect of the trochosphere), which stretches entirely above the oral surface in order to form the whole external surface of the adult, whilst the whole somatic face is crowded into the interior. The *Polyzoa*, as a whole, are placed in the second category, as opposed to *Phoronis*, and perhaps *Rhabdopleura*, in the first; both are derived from the trochosphere; BARROIS.

The *Phylactolemata* may have been derived from such forms as *Arachnidium* and *Victorella* among the *Gymnolemata*. The *Paludicelle* with winter buds were probably the first to develop; these "hiber-

nacula" are true buds with embryos, having both endoderm and ectoderm, and corresponding to the statoblasts of *Fredericella*. This last is regarded as a transitional form. Further modification takes place either by alteration in the chitinous cyst or multiplication of the tentacles. The lophophore becomes more developed; statoblasts appear both with and without swimming ring; the sessile ones disappear, replaced by spinose anchor-bearing forms.

As regards *Ontogeny*, the spermatozoa originate in spermatides of the endoderm, the head corresponding to the nucleus, and a "residual body" being present. The ova have a similar origin, and are surrounded by epithelial cells, constituting a simple ovary. Fertilisation occurs within the ovary. Segmentation is complete; part of the ovum forms a maternal envelope and degenerates. The gastrula is embolic, and its cavity is the future coelom. Invagination takes place at the anterior pole, the ectoderm lining the alimentary canal and the ganglion being formed from it. There are three invaginations into the polypide, the two lateral from the lophophore, the median part of the mesenteron. The hypoblast of the gastrula is regarded as mesoderm, and the *Polyzoa* as a link between the *Celenterata* and the *Enterocælia*. Nitsche's account of the development of statoblasts is confirmed; KRAEPELIN.

The ectoderm never disappears in the *Polyzoa*, as asserted by Vigelius, as may be shown by staining with silver; OSTROUMOFF (1).

For a discussion of the systematic value of the zoarium and zoecium, see KOSCHINSKY, pp. 6-15.

GEOGRAPHICAL DISTRIBUTION.

Kara Sea. 51 species (2 new); LEVINSSEN.

Jan Mayen. 76 species; LORENZ.

Livonia. 5 freshwater species; SCHMIDT.

Irish Coast. 14 species recorded by NICHOLS.

Liverpool Bay and District. 98 species (66 *Cheilostomata*, 13 *Cyclostomata*, 17 *Ctenostomata*, 2 *Entoprocta*,) recorded, with notes by LOMAS.

Channel Is. 20 species recorded by KÖHLER, p. 58.

Montecchio Maggiore. 105 species (6 new); GOTTARDI.

Bohemia. 13 species (2 new) enumerated, with notes and descriptions by KAFKA.

South Bavaria. 77 species (42 new species, 6 new genera) from Tertiary formations; KOSCHINSKY.

Gulf of Sebastopol. 11 species; OSTROUMOFF (4).

North Atlantic. 7 species; BUSK, p. iv.

South Atlantic. 22 species; *id. t. c.* p. v.

Southern Ocean. 11 species; *id. t. c.* pp. v & vi.

Australian Region. 17 species; *id. t. c.* pp. vi & vii.

Philippine Is. *Crisia denticulata*, Lmk., n. var. *gracilis*; *id. t. c.* p. vii.

Honolulu. *Idmonea radians*, Lmk.; *id. t. c.* p. vii.

ENTOPROCTA.

PEDICELLINEA.

PEDICELLINIDÆ.

Ascopodaria, n. g. "Polypide budding from and supported at the extremity of a chitinous, tubular, perforated stem, which expands below into a cylindrical, barrel-shaped dilatation, lined internally by a layer of longitudinal muscular tissue." For *Pedicellinopsis fruticosa*, Hks., and *A. discreta*, n. sp., Tristan da Cunha, Busk, pp. 41-44, pls. ix & x, figs. 1-12.

Pedicellina gracilis, Sars., n. var. *nodosa*, Isle of Man; Lomas, p. 190, pl. iii, fig. 2.

ECTOPROCTA.

PHYLACTOLÆMATA.

PLUMATELLIDÆ.

Plumatella hyalina, *P. lophopoidea*, n. spp., Bohemia, Kafka, pp. 237 & 238, figs. 7 & 8.

GYMNOLÆMATA

CYCLOSTOMATA.

CRISIADÆ.

Crisia acuminata, off Rio de la Plata, *C. cylindrica*, Tristan da Cunha, n. spp., Busk, pp. 5 & 7, pls. iii, fig. 1, & ii, figs. 2 & 4; with notes on and figs. of several other forms.

CAMERAPORIDÆ, n. fam.

Characterised by the presence of a chamber into which the zoëcia open; each series of zoëcia (often four rows of eight) has a partition between it and the next series; the lateral series have a lamella which forms the boundary wall of the family; Meunier & Pergens, p. 33. The family contains the following genera:—

Camerapora, n. g.: chambers each enclosing four to six rows of ten to twelve tubular zoëcia, and remaining always open; zoëcia closed by a calcareous membrane; for *C. recta*, n. sp., *iid. t. c.* p. 34, pl. ii, fig. 1.

Clausacamerapora, n. g.: chambers each enclosing four to five rows of tubular zoëcia; the walls of the chamber united in the middle, leaving circular apertures above and below by which the zoëcia communicate with the exterior; for *C. mamillata*, n. sp., *iid. t. c.* p. 35, pl. ii, figs. 2-4.

Curvacamerapora, n. g.: each colony formed of several chambers, separated by partitions bending towards the right, and communicating with the exterior by fissures between the curved partitions and by their upper part; for *C. cretacea*, n. sp., *id. t. c.* p. 36, pl. ii, fig. 5.

FASCIGERIDÆ.

Lopholepis rapax, n. sp., Cretaceous, Fauquemont, Meunier & Pergens, p. 33, pl. ii, fig. 6.

IDMONEIDÆ.

Bidiastopora corneti, n. sp., Cretaceous, Ciply, Meunier & Pergens, p. 37, pl. ii, fig. 9.

Idmonea eboracensis, Cape York, *I. fissurata*, off Rio de la Plata, n. spp., Busk, pp. 12 & 14, pl. iii, figs. 4 & 5.

Pustulopora, M.-Edw., distinct from *Eutalophora*, Lamx.; Busk, p. 18.

Reptotubigera cristata, n. sp., Cretaceous, Petit-Lavaye, Meunier & Pergens, p. 36, pl. ii, fig. 7.

FRONDIPORIDÆ.

Supercytis tubigera, n. sp., Heard I., Busk, p. 29, pl. v, fig. 4.

CTENOSTOMATA.

ALCYONIDULÆ.

Alcyonidium flustroides, n. sp., off S. Africa, Busk, p. 31, pl. x, figs. 13 & 14.

VESICULARIDÆ.

Amathia distans, *A. brasiliensis*, Bahia, *A. connexa*, Cape York, n. spp., Busk, pp. 33-35, pls. vii, figs. 1 & 2, & vi, fig. 3.

Farrella atlantica, n. sp., Bahia, *id. t. c.* p. 37, pl. vii, fig. 3.

Vesicularia papuensis, n. sp., Arafura Sea, *V. trichotoma*, Bass Strait, *id. t. c.* pp. 36 & 37, pl. viii, figs. 1 & 4. *V. (Bowerbankia) stationis*, n. sp., Sebastopol, Ostrooumoff, (5) p. 568.

CYLINDRÆCIDÆ.

Cylindræcium papuense, n. sp., Arafura Sea, Busk, p. 38, pl. viii, fig. 2: the genus also includes *C. giganteum*, Bk., *C. dilatatum*, Hks., *C. fuscum*, Bk., and *C. pusillum*, Hks.

Victorella pavida, Kent, has a gizzard; the operculum is not composed of setæ; a delicate membrane invests the viscera; the tentacles are setose; Bousfield.

CHEILOSTOMA.

EUCRATEADÆ.

Cheilonella, n. subg. *Hippothoa*, for *C. gigas*, n. sp., Bavarian Tertiary, Koschinsky, p. 57, pl. iii, fig. 5.

Eucratea chelata, L., n. var. *elongata*, Isle of Man, Lomas, p. 165, pl. iii, fig. 1.

CELLULARIADÆ.

Menipea duplex, n. sp. (= ? *Cellularia ternata* forma *duplex*, Smitt), Kara Sea, Levinsen, p. 309, pl. xxvi, figs. 1 & 2.

Scrupocellaria bertholletii, Aud., described and figured ; Hincks, p. 258, pl. ix, figs. 1 & 2.

BICELLARIADÆ.

Bugula spicata, *B. simplex*, n. spp., Adriatic, Hincks, p. 262, pl. ix, figs. 5 & 7. *B. murrayana*, Johnst., redescribed, with figs. ; Levinsen, p. 310, pl. xxvi, figs. 3-6. *B. calathus*, Norm., specific characters ; Vigeliuss, (3) : for development see p. 4, *antea*.

NOTAMIIDÆ.

Symnotum, n. g. Zoarium of erect, slender, bifurcating shoots, attached by tubular fibres. Zocœcia paired, back to back, connected by tubular prolongations with pair next but one below : front occupied by a membranous area ; sessile lateral avicularia, and an articulated avicularium between each pair of cells. Oœcium wanting. For *Gemellaria avicularis*, Pieper ; Hincks, pp. 255-258.

FLUSTRIDÆ.

Flustra securifrons, Pall., redescribed, with figs. ; Levinsen, p. 314, pl. xxvi, figs. 7-9.

MEMBRANIPORIDÆ.

Biflustra sulcata, n. sp., Montecchio Maggiore, Gottardi, p. 305, pl. xiv, fig. 2.

Discoflustrellaria ubaghsi, n. sp., Cretaceous, St. Pierre, Meunier & Pergens, p. 32, pl. ii, fig 8.

Discopora turgenervi, n. sp., Sebastopol, Ostrooumoff, (5) p. 566.

Membranipora operculata, n. sp., Adriatic, Hincks, p. 265, pl. ix, fig. 8. *M. serrulata*, Busk, redescribed, with figs ; Levinsen, p. 316, pl. xxvii, figs. 1 & 2. *M. armata*, *M. composita*, n. spp., Bavarian Tertiary, Koschinsky, pp. 20 & 21, pl. i, figs. 4, 1, & 2. *M. (Sendra) repiachowi*, n. sp., Sebastopol, Ostrooumoff, (5) p. 563.

Periteichisma, n. g. for *Vincularia geometrica*, Reuss, 1869 ; *id. t. c.*

p. 26. *P. umbraculiforme*, *P. microstomum*, *P. protectum*, *P. lenticulare*, n. spp., Koschinsky, pp. 26–28, pls. i, figs. 5, 6, & 7, & iv, fig. 1.

Rhagasostoma, n. g., always a strong frame round the cell, within which stretches the depressed operculum: the aperture, rather large and delicately bordered, lies within the frame, and has the form of a \square . Under the anterior margin of the aperture a ridge-like tooth projects into it more or less; for *R. circumvallatum*, *R. hexagonum*, *R. cingens*, n. spp., Bavarian Tertiary; *id. t. c.* pp. 29–31, pl. v, figs. 4–9.

MICROPORIDÆ.

Steganoporella discrepans, *S. similis*, n. spp., Bavarian Tertiary, Koschinsky, pp. 32 & 34, pls. iv, fig. 2, & i, figs. 8–10.

RETEPORIDÆ.

Retepora elongata, Smitt, redescribed with figs., Levinsen, p. 323, pl. xxvii, fig. 11.

CRIBRILINIDÆ.

Cribrilina tenuicosta, n. sp., *C. chelys*, n. n. (= *Celleporaria radiata*, Rss.), Bavarian Tertiary; Koschinsky, p. 36, pl. i, fig. 3.

PORINIDÆ.

Porina canaliculata, n. sp., Bavarian Tertiary, Koschinsky, p. 40, pl. iv, fig. 10.

SELENARIIDÆ.

Stichoporina simplex, *S. protecta*, *S. crassilabris*, n. spp., Bavarian Tertiary, Koschinsky, pp. 64–66, pls. vi, figs. 4–11, & vii, figs. 1–4.

Kionidella, n. g.: zoarium elevated from the surface of attachment, leaving a central space, with which the zoecia communicate by canals; aperture violin-shaped; avicularia are usually present near the aperture: for *K. excelsa* and *K. obliqueseriata*, n. spp., Bavarian Tertiary, *id. t. c.* pp. 67–69, pl. vii, figs. 5–13.

MYRIOZOIDÆ.

Schizoporella lineolifera, *S. magnifica*, *S. serratimargo*, n. spp., Adriatic, Hincks, pp. 267 & 268, pls. ix, fig. 10, & x, figs. 1 & 6. Other species figured. *S. limbata*, n. sp., Jan Mayen, Lorenz, p. 88, pl. vii, fig. 3. *S. fissa*, *S. subsquammoidea*, *S. perspicua*, n. spp., Bavarian Tertiary, Koschinsky, pp. 46–49, pls. iii, fig. 1, ii, fig. 1, & iv, fig. 3.

ESCHARIDÆ.

Cyphonella, n. subg. *Umbonula*, for *C. nodosa*, n. sp., Bavarian Tertiary, Koschinsky, p. 60, pl. vi, fig. 1.

Eschara lamellata, *E. prominens*, *E. porosa*, *E. intermedia*, n. spp., Montecchio Maggiore, Gottardi, pp. 306-309, pl. xiv, figs. 3-6.

Escharella reticulato-punctata, Hincks, *E. reticulata*, McGill., *E. tri-spinosa*, Johnst., redescribed, with figs.; Levinsen, pp. 318-320, pl. xxvii. *E. stylifera*, n. sp., Kara Sea, *id. t. c.* p. 321, pl. xxvii, figs. 8-10.

Lepralia vitrea, n. sp., Jan Mayen, Lorenz, p. 89, pl. vii, figs. 4-6. *L. fistulosa*, *L. schwageri*, *L. mediocris*, n. spp., Bavarian Tertiary; Koschinsky, pp. 50 & 51, pl. iv, figs. 4-6. *L. ombonii*, n. sp., Montecchio Maggiore, p. 305, pl. xiv, fig. 1.

Mucronella lævigata, *M. cystioides*, *M. semirecta*, *M. beneckeï*, *M. inhabilis*, *M. loricate*, *M. sutneri*, n. spp., Bavarian Tertiary; Koschinsky, pp. 52-57, pls. iii, figs. 2-4, 6-9, & v, fig. 1.

Pachykraspedon, n. g.: zoecia ovate or cylindrical, aperture surrounded by an annular ridge, usually semicircular, with a notch in the proximal margin; for *P. clarum*, *P. zittelii*, *P. lautum*, *P. separatum*, *P. götzreuthense*, n. spp., includes also *Lepralia otophora*, Ras., Bavarian Tertiary; *id. t. c.* pp. 43-45, pl. ii, figs. 2-6.

Porella tenuis, n. sp., Bavarian Tertiary, *id. t. c.* p. 60, pl. v, fig. 3.

Smittia rigida, n. sp., Jan Mayen, Lorenz, p. 91, pl. vii, fig. 9.

Umbonula margaritata, *U. cyrtoporoides*, n. spp., Bavarian Tertiary; Koschinsky, p. 59, pl. ii, figs. 8 & 9.

COSTULIDÆ, n. fam.

Zoecia having their frontal wall formed of flattened ribs, usually hollowed, radiating from the external border towards the median line of the zoecium, where they fuse intimately; these ribs are connected with each other sometimes by a larger or smaller number of transverse bars, sometimes side by side, the ribs always remaining visible; for *Costula*, n. g., for *Escharella arge*, d'Orb.; Jullien. It contains the following genera:—

Barroisina, n. g. for *Reptescharipora elegantula*, Hagenow, and *Lepralia haueri*, Reuss; *id. t. c.* p. 605.

Collarina, n. g. for *Lepralia cribrosa*, Waters, *Cellepora circumcincta*, Reuss, and *Eschara filiformis*, d'Orb.; *id. t. c.* p. 607.

Colletosia, n. g. for *Lepralia endlicheri*, Reuss, and *L. scarabæus*, Reuss; *id. t. c.* p. 610.

Cribrilina, Gray, 1848, of which *Eschara radiata*, Moll., not *Lepralia punctata*, Hass., is taken as type; *id. t. c.* p. 604.

Decurtaria, n. g. for *Semiescharipora cornuta*, Beissel; *id. t. c.* p. 606.

Figularia, n. g. for *Lepralia figularis*, Johnst., and *L. elegantissima*, Seg.; *id. t. c.* p. 608.

Jolietina, n. g. for *Cribrilina latimarginatu*, Busk; *id. ibid.*

Lyrula, n. g. for *Cribrilina hippocrepis*, Hincks; *id. t. c.* p. 606.

Mumiella, n. g. for *Semiescharipora mumia*, d'Orb.; *id. t. c.* p. 605.

Murinopsia, n. g. for *Semiescharipora galeata*, Beissel, and *Multescharipora francgana*, d'Orb.; *id. t. c.* p. 608.

Puellina, n. g. for *Lepralia gattyæ*, Busk.; *id. t. c.* p. 607.

Reginella, n. g. for *Cribrilina furcata*, Hincks; *id. t. c.* p. 605.

Scorpiodina, n. g. for *Lepralia scorpioides*, Manzoni; *id. t. c. p.* 611.

Steginopora, d'Orb., with *S. ocellata*, n. sp., Port Brehay, as type; *id. t. c. pp.* 609 & 614, pl. xix, figs. 1-3: contains also *S. meudonensis* and *S. de morgani*, n. spp., Meudon; *id. t. c. pp.* 614-616, pls. xvii-xx.

Thoracophora, n. g. for *Disteginopora horrida*, d'Orb.; *id. t. c. pp.* 610 & 619 [*nom. præocc.*—REC.].

Ubaghsia, n. g. for *Steginopora reticulata*, Ubaghs, and *U. arcifera*, n. sp.; *id. t. c. pp.* 610 & 616-619, pls. xviii, figs. 4 & 5, and xx, figs. 2-4.

CELLEPORIDÆ.

Batopora scrobiculata, n. sp., Bavarian Tertiary, Koschinsky, p. 63, pl. vi, figs. 2 & 3.

Cellepora ventricosa, *C. nodulosa*, n. spp., Jan Mayen, Lorenz, p. 96, pl. vii, figs. 14-16.

Rhamphostomella, n. g. Oval; zocæia arranged alternately and slightly prominent, with broad semicircular mouth, closed by a thin membranous operculum; aperture bordered below and laterally by a peristomial elevation, with a notch in the centre in which is placed an avicularium; the side to which the latter is attached being prominent and often resembling the rostrum of a *Cellepora*; oœcia hemispherical and perforated; zoarium of one layer. For *Cellepora scabra* (Fabr.), *R. costata* (= *C. scabra*, Fab., *pars*), *R. spinigera* (= *C. plicata*, Smitt, *pars*), n. spp., Jan Mayen; *id. t. c. pp.* 93 & 94, pl. vii, fig. 12.

CRUSTACEA.

BY

G. HERBERT FOWLER, B.A., PH.D.

I.—INTRODUCTION.

THE year has been marked by great activity on the part of carcinologists, to which the publication of several 'Challenger' Reports has contributed not a little. The Reports on *Isopoda* (Beddard, 6), on *Stomatopoda* (Brooks, 22), on *Brachyura* (Miers, 142), on *Cumacea* and *Phyllocarida* (Sars, 184, 183), have enriched science with many new and strange forms, and contributed greatly to our knowledge of the phylogeny and outogeny of their respective groups. Of the North Atlantic fauna, Smith (199) and Sars (186) record the forms obtained by the 'Albatross' and Norwegian North Atlantic Expeditions respectively.

The works of Claus (33) on the anatomy and development of *Branchipus* and *Artemia*, and of Reichenbach (174) on the development of *Astacus*, may fairly be said to stand at the head of the morphological investigations of 1886.

One of the most interesting observations is that recorded by Weismann (218), the discovery of undoubted polar bodies in the parthenogenetically-produced ova of *Phyllopora*, throwing a new light upon the various aspects of reproduction.

II.—LIST OF PUBLICATIONS.

* ANDERSON, W. [*Vide* KINNEAR (113).]

1. ANDRUSSOW, V. Ueber zwei neue Isopodenformen aus neogenen Ablagerungen. JB. Mineral. 1886, ii, pp. 155-174, 1 pl.
2. AURIVILLIUS, C. W. S. Bemerkungen zu einem Aufsatz: "Descrizione di un nuovo *Lichomolgus* parassita del *Mytilus gallo-provincialis*." Zool. Anz. ix, pp. 77-79.

Regards the *Lichomolgus* described in memoir 172 as identical with that described by him as *Modiolicola insignis*.

For the papers marked with one asterisk I am indebted to the Zool. Anz. for 1886-7; for those with two to the Zool. Jahresb. for 1885.

3. AYERS, H. On the Carapax and Sternum of Decapod *Crustacea*. Bull. Ess. Inst. xvii, pp. 49-59, 2 pls.; abstr. in J. R. Micr. Soc. 1887, p. 85.

Regards the carapace as formed from the terga of the somites of the antennæ and mandibles, basing this view on young *Squilla* and *Zoëa*.

4. BAILY, W. H. Trilobites from Lower or Cambro-Silurian Strata in the County of Clare. P. R. Dubl. Soc. iv (n.s.), p. 373; also J. R. Geol. Soc. Ireland (n.s.) vii, p. 29.
5. BEDDARD, F. E. Preliminary Notice of the *Isopoda* collected during the Voyage of H.M.S. 'Challenger.' Pt. III. P. Z. S. 1886, pp. 97-122.

Short accounts of about 45 n. spp., with remarks on distribution, &c.

6. —. The *Isopoda* collected by H.M.S. 'Challenger.' II. Chall. Rep. Zool. xvii, 178 pp., 25 pls., 1 map.

Follows classification of Sars [Zool. Rec. xxii, *Crust.* p. 23]. Bathymetric distribution, pp. 157-163; horizontal distribution, pp. 163-165; eyes of deep-sea forms p. 165; development of spines in deep-sea and Arctic forms, p. 167.

7. BELLONCI, G. Intorno al ganglio ottico degli arthropodi superiore. Intern. J. Anat. Hist. iii, pp. 195-204, 1 pl.

Treats of the brain and optic ganglion of *Porcellio*, *Idotea*, *Nephrops*, and *Squilla*.

8. BERTKAU, P. Zwei Bemerkungen zu E. Ray Lankester's Artikel: "Prof. Claus and the Classification of the *Arthropoda*." Zool. Anz. ix, pp. 430-432.

9. BOAS, J. E. V. Kleinere Carcinologische Mittheilungen. Zool. Jahrb. ii, pp. 109-116.

A new species of *Apseudes*, and some remarks on the discussion of last year [*vide* Zool. Rec. xxii, *Crust.*, Boas (9), Claus (30)].

BONNIER, J. [*Vide sub* GIARD (70) (71) (72).]

10. *BORRE, A. P. DE. Notes sur les Crustacés Isopodes de Belgique. CR. ent. Belg. (3) No. 71, pp. lxxiv-lxxxvi.

11. *——. Crustacés Isopodes recueillis par feu Cam. Van Volxem, pendant son voyage en Portugal, en 1871. CR. ent. Belg. (3) No. 72, pp. cxii & cxiii.

12. BOURNE, G. C. Fauna of Diego Garcia, Chagos Group. P. Z. S. 1886, p. 331.

Corroborates the sometimes questioned account of the habit of climbing cocoa-nut palm trees in *Birgus latro*.

13. *BOVALLIUS, C. *Amphipoda Synopidea*. Upsala: 1886, 4to, 36 pp., 3 pls.

14. [BOVALLIUS, C.] Remarks on the Genus *Cysteosoma* or *Thaumtops*. Bih. Sv. Ak. Handl. xi, No. 9, 16 pp., 1 pl.

Replaces the old name of Guérin-Méneville by *Thaumtops* of Willemoes-Subm; ranks the family between *Mimonectidae* and *Phronimidae*, and includes under it 4 spp., of which 2 are new.

15. —. Notes on the Family *Asellidae*. *Op. cit.* No. 15, 54 pp.

Synonymy and diagnostic characters of the spp. and genera of this family; 3 new genera are added.

16. —. On some Forgotten Genera of Amphipodous Crustacea. *Op. cit.* x. No. 14, 18 pp., 1 pl.

Restores the three absorbed genera, *Lanceola* (Say), *Tyro* (M.-Edw.), and *Tauria* (Dana); with preliminary diagnoses of new species, to be more fully treated in a promised monograph.

17. BRADY, G. S. Fresh-water *Entomostraca* from South Australia. P. Z. S. 1886, pp. 82-93, 3 pls.

Descriptions of several new *Phyllopoda* and *Ostracoda*.

18. —. *Entomostraca* collected in Ceylon. J. L. S. xix, pp. 293-315, pls. xxxvii-xl.

Descriptions and figures of n. spp., of which the marine forms were obtained at Calpentyn, Gulf of Manaar; the fresh-water from Colombo. Figures are also given of some older species. The fresh-water fauna exhibits a marked resemblance to that of N. Europe. One new genus, *Cyprinotus*, is founded.

19. BRAUER, F. Ueber *Artemia* und *Branchipus*. Zool. Anz. ix, pp. 364 & 365.

Finds a difference between these genera in the presence or absence of the caudal fork, not recorded by Schiemanekewitsch.

20. **BRAUN, M. Physikalische und biologische Untersuchungen im westlichen Theil des Finnischen Meerbusens. Arch. Nat. Liv. (2) x, pp. 1-129.

21. BROOKS, W. K. The *Stomatopoda* of the 'Challenger' Collection. J. Hopk. Univ. Circ. v, pp. 83-85; abstr. in J. R. Micr. Soc. (2) vi, p. 605.

Abstract of some of the general results of the Chall. Rep. [vide (22).]

22. —. The *Stomatopoda* collected by H.M.S. 'Challenger.' Chall. Rep. Zool. xvi, 116 pp., 16 pls.

Includes 15 spp. (of which 8 are new to science) and a very large number of larval forms. The author ranks *Coronis* under *Lysiosquilla*, and *Chloridella* under *Squilla*. The phylogenetic relations are very fully treated in the introduction, pp. 1-20, with a description of the accessory copulatory organs in the male, p. 13. The various types of larvæ are separately treated in an appendix, pp. 81-114; references to them are given in the systematic part of this Record, under the heads of the adult genera.

23. BRONN, H. G. Klassen und Ordnungen des Thier-reichs (fortges. v. A. Gerstaecker). Bd. v, Abth. ii, Lief. 16-17, pp. 417-512. Leipzig and Heidelberg: 1886, 8vo.

Biology and systematics of *Amphipoda*.

24. **BUDDE-LUND, G. *Crustacea Isopoda terrestria*, per familias et genera et species descripta. Hauniæ: 1885, 8vo, 319 pp.; notice in Ann. N. H. (5) xvii, pp. 81-84.

A systematic monograph of terrestrial *Oniscidae*; divides them into four tribes—*Onisci* (*Armadilloidea*, *Oniscoidea*), *Ligie*, *Tylides*, *Syspasti*. (Title only given in Zool. Rec. xxii.)

25. BUREAU, E. Sur la formation de Bilobites à l'époque actuelle. C.R. ciii, p. 1164.

Regards them as tracks of Decapod (?) *Crustacea*, owing to observations on *Crangon vulgaris*.

26. CANU, E. Deux Copépodes nouveaux parasites des Synascidies. Bull. Sci. Nord (2) ix, pp. 309-320 & 365-376, 2 pls.; vide also C.R. ciii, pp. 1025-1027.

List of publications relating to similarly-placed *Copepoda*, with description of *Aplostoma brevicauda*, n. g. & sp., pp. 312-320. *Enteropsis pilosus*, n. sp., pp. 365-372.

27. **CARUCCIO, A. Viaggio di circumnavigazione della R. corvetta 'Caracciolo' negli anni 1881-1884; i, pp. 312 & 313.

Enumeration of forms, chiefly from Panama and Patagonia.

28. CARTER, J. Decapod Crustaceans of the Oxford Clay. Q. J. Geol. Soc. xlii, pp. 542-559, 1 pl.

Seven n. spp. are described and figured; accounts are also furnished of several known forms.

29. 'CHALLENGER,' Narrative of the Cruise of H.B.M. Ship; vol. i, pts. 1 & 2. London: 1885, 8vo.

Crustacea of the Gulf Weed, p. 136; *Macrura* (Spence Bate), pp. 522-528; *Brachyura* (Miers), pp. 585-592; *Amphipoda* (Stebbing), pp. 618-622; *Schizopoda* (Sars), p. 739; *Cumacea* (Sars), p. 742; *Phyllocarida* (Sars), p. 743; *Stomatopoda* (Brooks), p. 817; *Copepoda* (Brady), p. 843; *Ostracoda* (Brady), p. 846; *Cirrhimedia* (Hoek), pp. 851-856; *Isopoda* (Beddard), pp. 878-882; *Anomura* (Henderson), pp. 897-901.

30. CHEVREUX, E. Suite d'une liste des Crustacés Amphipodes et Isopodes des environs du Croisic. CR. Ass. Fr. Sci. xiii, pp. 312-315.

31. —. Le *Pagurus prideauxii* et ses commensaux. T. c. p. 316.

Confirms Stuart-Wortley's observation that *Adamsia palliata* may be induced to change to another shell by *Pagurus*.

32. CLAUS, C. Ueber die Charaktere der Gattung *Artemia* in Gegensatz zu *Branchipus*. Anz. Ak. Wien, xxiii, pp. 43-45.

33. [CLAUS, C.] Untersuchungen ü. d. Organisation und Entwicklung von *Branchipus* und *Artemia*, nebst vergleichenden Bemerkungen ü. andere Phyllopoden. Arb. z. Inst. Wien, vi, 104 pp., 6 pls.; abstr. in J. R. Micr. Soc. (2) vi, pp. 602-605.

34. —. Ueber die Entwicklung und den feinern Bau der Stilaugen von *Branchipus*. Anz. Ak. Wien, xxiii, pp. 60-63; abstr. in Ann. N. H. (5) xviii, p. 78, and in J. R. Micr. Soc. (2) vi, p. 980.

35. —. On Prof. E. Ray Lankester's Memoir "*Limulus* an Arachnid." Ann. N. H. (5) xviii, pp. 55-65.

A continuation of the controversy referred to below, in which the author points out the difference of his conception from that of Prof. Lankester, and rediscusses the phylogeny of the *Arthropoda*. [Vide LANKESTER (122) (123).]

36. —. Reply to Prof. E. Ray Lankester's "Rejoinder." Ann. N. H. (5) xviii, pp. 467-470.

37. —. Prof. E. Ray Lankester's Artikel "*Limulus* an Arachnid," &c. Arb. z. Inst. Wien, vii, p. 119.

38. COLLETT, R. On the External Characters of Rudolphi's Rorqual (*Balenoptera borealis*). P. Z. S. 1886, p. 243.

Records the occurrence of *Balenophilus unisetus* on this Whale, with woodcuts of its *Nauplius*-larva and of *Calanus finmarchicus*, the latter being the Whale's chief source of food.

39. **COLLIN, J. Om Limfjordens tidligere og nuværende marine Fauna med særligt hensyn til bløddyrfaunæ. Kopenhagen : 1884, 168 pp., 1 pl. [Crustacea, p. 21.]

40. **CZERNIAVSKY, W. Crustacea Decapoda Pontica littoralia; materialia ad zoographiam Ponticam comparatam. II. Beil. to Tr. Soc. Univ. Kharkow, xiii, 1884, 268 pp., 7 pls.

Describes young forms of almost all the Black Sea genera; draws a phylogenetic tree of the spp. of *Leander*; and terms the stage between *Zoëa* and *Megalopa*, *Pseudozoëa*.

41. DADAY, E. VON. Beiträge zur Kenntniss der Platten-see Fauna. Math. Nat. Ber. Ung. iii, pp. 179-185.

With 1 new species of *Pleuroxus*.

42. —. Magyarországbán eddig talált szabadon élő evezőlábú rákok manganrajza (Monographia Eucopodorum liberorum in Hungaria hucusque repertorum). Math. term. köz. xix, pp. 117-311, 4 pls.

The definitions of the species are given in Latin; the rest is in Hungarian.

43. **—. Catalogus Crustaceorum faunæ Transsylvaniæ, e collectione musei Transsylvanici. Ber. Siebenbürg. Mus. Ver. Klausenberg, 1884, 27 pp.

44. **—. Pelagische Fauna einiger Süßwasserteiche Ungarns und Siebenbürgens. Kolosvári Orvos-term. társ. Értes. xi, pp. 227-250.

45. [DADAY, E. VON.] Neue Thierarten aus der Süßwasser Fauna von Buda-pest. Term. füzetek, ix, pp. 127-135, 1 pl.; abstr., p. 208.
46. DANNEVIG, G. M. Hatching Lobsters in Norway. Bull. U. S. Fish Comm. v, pp. 280, 437, & 446; vi, p. 13.
47. DAMES, W. Ueber einige Crustaceen aus den Kreide-ablagerungen des Libanon. Z. geol. Ges. xxxviii, pp. 551-575, 3 pls.
48. DELAGE, Y. Sur l'embryogenie de la *Sacculina Carcini*. Bull. Soc. Finistère, vii, fasc. ii, pp. 61-63.
 Short account of formation of *Cypris*-form from *Nauplius*, of fixation, "inoculation," and conversion into the adult shape.
49. —. Sur une fonction nouvelle des otocystes chez les Invertébrés. C.R. ciii, pp. 798-801.
 Proves that the presence of the otocysts is necessary to insure correct locomotion, a similar function to that observable in the labyrinth of higher forms.
50. —. Sur la Sacculine. *Op. cit.* cii, p. 1336.
 Response to GIARD (76).
51. —. Evolution de la Sacculine (*Sacculina carcini*). Biol. Centralbl. vi, pp. 14-19.
 Abstract by C. Emery of the original paper in Arch. Z. expér. (2) ii, p. 417.
52. —. Sur le système nerveux du *Peltogaster*. Arch. Z. expér. (2) iv, pp. 17-36, pl. i; abstr. in J. R. Micr. Soc. (2) vi, p. 792.
 A preliminary notice was recorded in Zool. Rec. xxii [*vide* also J. R. Micr. Soc. (2) vi, p. 243]. A central ganglion gives off three groups of nerves: anteriorly the cloacal and pallial, laterally the parieto-visceral, posteriorly the pallio-visceral. Most of these find homologues in *Sacculina*.
53. DOLLO, M. L. La Vie au sein des Mers. Rev. Quest. Sci. xix, pp. 476-513; xx, pp. 168-192.
54. DUNS, E. On Abnormal Limbs of Crustacea. P. Phys. Soc. Edinb. ix, pp. 75-78, 1 pl.; abstr. in J. R. Micr. Soc. 1887, p. 85.
 Describes abnormalities in *Carcinus maenas*, *Cancer pagurus*, and *Nephrops norvegicus*.
55. DYBOWSKI, B. Neue Beiträge zur Kenntniss der Crustaceen-fauna des Baikal-sees. Bull. Mosc. lix, pp. 17-57, 3 pls.
 ETHERIDGE, R. [*Vide* JONES (99).]
56. EYLMANN, E. Beitrag zur Systematik der europäischen Daphniden. Ber. Freib. Ges. ii, pt. 2, pp. 1-88, 3 pls.
 Tabular diagnosis of Daphnidan genera, p. 5; of spp. of *Daphnia*, p. 8; genus *Daphnia*, p. 4; *Simocephalus*, p. 43; *Scapholeberis*, p. 51; *Ceriodaphnia*, p. 56; *Moina*, p. 69; geographical distribution, p. 79; formation of local varieties, p. 81.

57. FAXON, W. Preliminary Catalogue of the Crayfishes of Kansas. Bull. Washb. Coll. i. pp. 140-142.

58. FILHOL, H. Considérations relatives à la Faune des Crustacés de la Nouvelle Zélande. Bibl. haut. études, xxx, 60 pp. [recorded as not seen, Zool. Rec. xxii, *Crust.* p. 4].

Short diagnoses of many new species; list of *Crustacea* known from New Zealand, pp. 49-57; affinities of these in distribution, pp. 57-60. Fuller accounts and figures are given in (59).

59. —. Mission de l'Ile Campbell. Rec. Vénus, iii, pt. 2 [*Crustacea*, chap. vii, pp. 349-510].

Full account of the species obtained. Only those forms are quoted in the Systematic Part of this Record of which figures and important descriptions are given.

60. FISCHER, P. Sur deux espèces de *Lepas* fossiles du Miocène des environs de Bordeaux. Act. Soc. L. Bord (4) x, pp. 189-192, 1 pl.

61. *FISZER, Z. Materyaly do fauny krajowych skorupiaków liscionogich (Materialen zur vaterländischen Crustaceen-fauna der Phyllopoden). Pam. Akad. fizyogr. v, pp. 195-201, 5 pls.

62. —. O nowym rodzaju z rodziny skorupiaków Ryboszowatych (Un nouveau genre des Cymothoides, l'*Ononia*). Kosmos (Lemberg), fasc. vii-ix, 1885, pp. 458-471, 1 pl.; abstr. in Arch. slav. Biol. i, p. 466; also in J. R. Micr. Soc. 1887, p. 87.

Lives parasitic on *Idus waleckii* of the Amoor; fresh-water form resembling *Livoneca sinuata*.

63. FORBES, S. A. *Leptodora* in America. Am. Nat. xx, p. 1057. [Vide also p. 896.]

64. FOREL, A. Fauna der Schweizer Seen. Biol. Centralbl. vi, pp. 201-204.

Criticism of the "voluntary" and "involuntary" habitat in deep water, and of the method by which the former was acquired. [Vide Zool. Rec. xxii, *Crust.* p. 4; also Naturforscher, xix, p. 191.]

65. **FRISTEDT, K. Bidrag till kännedomen om de vid Sveriges vestra kust levande *Spongie*. Sv. Ak. Handl. xxi, No. 6, p. 41.

Esperia lingua as dwelling for *Aristias tumidus* and *Leucothoe spinicarpa*.

66. FROMMANN, C. Untersuchungen über Struktur, Lebenserscheinungen, und Reaktionen tierischer und pflanzlicher Zellen. Jen. Z. Nat. xvii; abstr. in Biol. Centralbl. v, p. 159.

Treats of the blood corpuscles of *Asellus* and *Astacus*.

67. **GADEAU DE KERVILLE, H. Aperçu de la faune actuelle de la Seine et de son embouchure. In "L'Estuaire de la Seine," by G. Lennier, ii, pp. 168-197.

68. —. La Faune de l'Estuaire de la Seine. [Only separate copy seen; from the Annuaire Normande, 1886.]

Records the various *Crustacea*—fresh-water, brackish, and marine.

69. GEHUCHTEN, A. VAN. Etude sur la structure intime de la cellule musculaire striée. *Cellule*, ii, pp. 293-453, 6 pls.

Develops the view of Carnoy that "the muscle cell is a normal cell, of which the reticulum is arranged in a definite manner, and the enchylema charged with myosin." *Astacus*, pp. 344-351; *Dichelestium* and *Apus*, p. 357.

70. GIARD, A., & BONNIER, J. Sur le genre *Entione*. C.R. ciii, pp. 645-647; abstr. in J. R. Micr. Soc. 1887, p. 85.

71. — & —. Sur le genre *Cepon*. T. c. pp. 889-892.

Account of the hosts, systematic position, and larval stages of this Bopyridan.

72. — & —. Nouvelles Remarques sur les *Entoniscus*. *Op. cit.* cii, pp. 1173-1176; abstr. in J. R. Micr. Soc. (2) vi, p. 607.

Describes 2 new species, with some remarks on anatomy.

73. —. Sur quelques Crustacés des côtes du Boulonnais. Bull. Sci. Nord (2) ix, pp. 279-281.

74. —. De l'influence de certains parasites rhizocéphales sur les caractères sexuels extérieurs de leur hôte. CR. ciii, pp. 84-86; abstr. in J. R. Micr. Soc. (2) vi, p. 792.

Sacculina fraissei, n. sp., effects a reduction of certain appendages both in the male and female *Stenorhyncus phalangium*.

75. —. Sur l'*Entoniscus mænadis*. CR. cii, pp. 1034-1036; abstr. in J. R. Micr. Soc. (2) vi, p. 607; also Ann. N. H. (5) xvii, p. 535.

Parasitic with *Sacculina* on *Carcinus mænas* at Wimereux.

76. —. Sur l'orientation de *Sacculina carcini*. CR. cii, pp. 1082-1085; abstr. in J. R. Micr. Soc. (2) vi, p. 608.

Hypothetical cause of the constant orientation. [*Vide* DELAGE (50).]

77. GIESBRECHT, W. Zoologischer Jahresbericht für 1885, Abth. ii. [*Crustacea*, pp. 8-64.]

78. GILSON, G. Étude comparée de la spermatogénèse chez les Arthropodes (suite). *Cellule*, ii, pp. 83-239, pls. ix-xv.

A continuation of this study commenced in the previous volume [*vide* Zool. Rec. xxii, *Crust.* (19).] Pp. 83-202 are occupied with *Crustacea*: *Isopoda*, p. 89; *Decapoda*, p. 115; *Stomatopoda*, p. 188; *Schizopoda*, p. 193; *Cirrhipedia*, p. 198.

79. GÜLDI, E. A. Studien über neue und weniger bekannte Podophthalmen Braziliens. Arch. f. Nat. lii, 1, pp. 19-46, 2 pls.

Of this a preliminary notice had appeared [Zool. Anz. viii, p. 662]. Here descriptions and figures are furnished of the new species which were referred to in Zool. Rec. xxii, *Crust.* p. 15.

GOODCHILD J. G. [*Vide* POSTLETHWAITE (170).]

80. GOURRET, P. Considérations sur la Faune Pélagique du Golfe de Marseille. Ann. Mus. Marseille, ii, 101 pp.; and notes in Rev. Sci. (3) xxxv, pp. 81-83.

The nocturnal exclusion of *Decapoda* larvæ, p. 15; the apparent identity of larvæ of the same genus but different species, p. 20. In chap. ii, p. 31, the animals are arranged according to the pelagic or semi-pelagic habit and the habitat which they exemplify; *Copepoda*, p. 47; *Schizopoda*, p. 52; *Idoteidæ*, p. 59; *Anceidæ*, p. 60; *Portunidæ*, p. 61; this chapter is full of references to *Crustacea*. The first two plates illustrate *Zoëæ*.

81. GUERNE, J. DE. Description du *Centropages grimaldii*. Bull. Soc. Z. Fr. xi, pp. 276-285.
82. GULLAND, G. L. The Sense of Touch in *Astacus*. P. Phys. Soc. Edinb. ix, pp. 151-180, 2 pls.

An account of the literature bearing on the subject precedes a histological and physiological study of the tactile setæ in the various parts of the body, with observations on the genealogy of the various forms of seta.

83. HALLEZ, P. Un mot d'histoire à propos de l'amputation réflexe des pattes chez les Crustacés. Bull. Sci. Nord (2) ix, p. 342.

Recalls Réaumur's descriptions of the process.

84. HALLIBURTON, W. D. On the Blood of Decapod *Crustacea*. J. Physiol. vi, pp. 300-335, 1 pl.; abstr. in J. R. Micr. Soc. (2) vi, p. 241.

Finds the phenomena of coagulation to be almost identical with those in Vertebrate blood. Hæmocyanin resembles in some points serum globulin; the Crustacean fibrinogen similarly has a certain likeness to the same body in *Vertebrata*. Blood-colouring matters (hæmocyanin, tetronerythrin, &c.), p. 323. List of animals in which hæmocyanin and other blood-colouring matters are known, p. 332.

85. *HANSEN, H. J. Oversigt over de paa Dijnphna-Togtet indsamlede Krebsdyr. Dijnphna-Togtets zool.-bot. Udbytte, pp. 185-286. Copenhagen: 1886, 8vo, 5 pls.

Isopoda, 15 spp., 3 n. spp.; *Amphipoda*, 40 spp., 6 n. spp.; *Decapoda*, 10 spp.; *Cumacea*, 4 spp.; *Mysidæ*, 4 spp.; *Euphausiidæ*, 1 sp.; *Branchiopoda*, 4 spp.; *Copepoda*, 12 spp., 4 n. spp., including n. g. *Gastroecus*, n. fam., *Choniostomatidæ*, n. g. *Choniostoma*, with 1 n. sp.; *Cirrhipedia*, 2 spp.

86. —. Vorläufige Mittheilung über Pycnogoniden und Crustaceen aus dem nördlichen Eismeer, von der Dijnphna-Expedition mitgebracht. Zool. Anz. ix, pp. 638-643.

Some results of the preceding paper are mentioned, notably observations on larval appendages.

87. HENDERSON, J. R. A Synopsis of the British *Paguridæ*. P. Phys. Soc. Edinb. ix, pp. 65-75.

Diagnoses of Brit. spp., with synonyms and localities.

88. HERRARA, A. Apuntes para el Estudio de la *Limnadia filomatica*. Nat. Mex. vii, pp. 156-159, a half-plate.

89. HERRICK, F. H. Notes on the Development of *Alpheus* and other Crustacea, and on the Development of the Compound Eye. J. Hopk. Univ. Circ. vi, pp. 42-44, 1 woodcut.

From these researches it appears that the mesoderm originates at two periods, from invaginated epiblast, and, later, from superficial epidermis. All parts of the eye, excepting actual nerve tissue, are derived from a superficial layer of elongated columnar epiblast, which multiplies into cell strings; each of the latter becomes an optic element, and is not separated by an envelope of any kind from the rest.

90. HILGENDORF, F. Cretacische Squilliden-Larven vom Libanon. SB. nat. Fr. 1885, p. 184.

91. *HOEK, P. P. C. *Limnoria lignorum*. Tijdschr. Nederl. Dierk. Ver. (2) i, Versl. pp. cxxvi-cxxx & cxxxviii.

92. HOLDER, C. F. Some Peculiar Habits of the Crayfish. Popular Science Monthly, October, 1886; and Am. Micr. J. vii, p. 210.

HOLL, H. B. [*Vide* JONES (106) (107).]

93. HOLM, G. Revision der Ostbaltischen Silurischen Trilobiten. Abth. ii. Illaeniden. 173 pp., 12 pls.

Figures and descriptions of 15 new and several old species.

94. HOWELL, W. H. Observations on the blood of *Limulus polyphemus*, *Callinectes hastatus*, and a Holothurian. Stud. Biol. Lab. J. Hopkins Univ. iii, pp. 267-287.

A comparison of the behaviour of the blood of *Limulus* with that of the Crustacean does not indicate any relationship between the two forms.

95. IMHOF, O. E. Vorläufige Notizen ü. d. horizontale u. verticale geographischen Verbreitung d. pelagischen Fauna der Süßwasser-becken. Zool. Anz, ix, pp. 335-338.

96. —. Ueber mikroskopische pelagische Thiere aus der Ostsee. T. c. pp. 612-615.

97. —. Neue Resultate über die pelagische und Tiefsee-Fauna einiger im Flussgebiet des Po gelegener Süßwasserbecken. T. c. pp. 41-47.

98. —. Zoologische Mittheilungen. Viert. Ges. Zürich, xxx, p. 369.

Author continues in the Italian lakes his observations on fresh water fauna.

99. JONES, T. R., WOODWARD, H., & ETHERIDGE, R. The Fossil *Phyllopoda* of the Palæozoic Rocks. Third Report of Committee. Rep. Brit. Ass. 1885, pp. 326-361.

Discussion of Dames' view, and of the relations of *Nebalia* to *Phyllopoda*, pp. 328-334.

100. [JONES, T. R.] Fossil *Ostracoda* from Colorado. Geol. Mag (3) iii, pp. 145-148, 1 pl.
4 new and 2 former spp. from fresh-water "*Atlantosaurus*" Jurassic beds.
101. —. On Palæozoic *Phyllopoda*. T. c. pp. 456-462. *
Additional remarks to Brit. Ass. Rep. [Vide JONES, WOODWARD, & ETHERIDGE (99).]
102. — & KIRKBY, J. W. Carboniferous *Ostracoda* from the Gayton Boring, Northamptonshire. Geol. Mag. (3) iii, pp. 248-253, 1 pl.; also J. Northampt. Soc. iv, p. 98.
5 former and 1 new spp., *Kirkbya variabilis*.
103. — & —. Fringed and Other *Ostracoda* from the Carboniferous Series. T. c. pp. 433-439, 2 pls.
New genera, *Beyrichiopsis*, *Beyrichiella*; 8 new spp.
104. — & —. Distribution of the *Ostracoda* of the Carboniferous Formations of the British Isles. Q. J. Geol. Soc. xlii, pp. 496-514.
Beyrichiopsis, *Phreatura*, *Youngia*, n. gg.
105. — & —. List of Bivalved *Entomostraca* in the Carboniferous Formations of Great Britain and Ireland. P. Geol. Ass. ix, pp. 495-515.
106. —, & HOLL, H. B. Notes on the Palæozoic Bivalved *Entomostraca*. xx. On the Genus *Beyrichia* and some New Species. Ann. N. H. (5) xvii, pp. 337-363, 1 pl.
Revision of the genus, with several new spp.
107. — & —. Notes on the Palæozoic Bivalved *Entomostraca*. xxi. On some Silurian Genera and Species. T. c. pp. 403-414, 1 pl.
108. KAFKA, J. Kritisches Verzeichniss der Ostrakoden der Böhmischen Kreideformation. SB. böhm. Ges. 1885, pp. 51-57, 1 pl.
109. —. Príspevek ku poznání cirripedu českého útvaru křídového. T. c. pp. 554-575, 3 pls.; abstr., pp. 575-577.
With several new species of Cirrhipeds, quoted in the Systematic Part.
110. KAUFMANN, A. Beiträge zur Kenntniss der Cytheriden. Rec. Z. Suisse, pp. 131-207, pls. vi-xi; abstr. in J. R. Micr. Soc. (2) vi, p. 440.
Synopsis of genera, p. 206.
111. KINGSLEY, J. S. The Arthropod Eye. Am. Nat. xx, p. 862.
Review of recent literature, and original observations on development of eye in *Crangon*.
112. —. The Development of the Compound Eye of *Crangon*. Zool. Anz. ix, pp. 597-600.

Author states that there is nothing in its development to bear out the view that eye or eyestalk are homodynamous with appendages; and that its development from a single invagination shows it is not to be regarded as a coalescence of ocelli.

113. KINNEAR, W. T., & ANDERSON, W. Carboniferous *Crustacea* from Ardross Castle. Tr. Edinb. Geol. Soc. v, p. 53.

114. *KIRCH, J. B. Das Glykogen in den Geweben des Fluss-Krebsses. Inaug.-dissert. Bonn : 1886. 8vo, 48 pp.

KIRKBY, J. W. [*Vide* JONES (102) (103) (104) (105).]

115. KLIVER, M. Ueber *Arthropleura armata*. Palæontogr. xxxi, pp. 11-18, 2 pls.

Of doubtful zoological affinity, perhaps related to *Eurypterus*.

116. KOEHLER, R. Recherches sur la Faune Marine des Iles Anglo-Normandes. Bull. Soc. Nancy (2) vii, fasc. xvii, p. 51.

Account of the species collected in a visit to the Channel Islands. Another account given in Ann. Sci. Nat. (6) xx, 62 pp. 1 pl. *Crustacea* of Jersey, pp. 20-27; of Guernsey, p. 40; of Herm, p. 50; of Sark, p. 54; general list, pp. 59-61. Translated Ann. N. H. (5) xviii, pp. 229-243; reprinted Bibl. haut. études, xxxii, with 1 pl.; also a supplement, Bull. Soc. Nancy (2) viii, fasc. xix, pp. 100-126.

117. *KOELBEL, C. Crustaceen Pycnogoniden und Arachniden von Jan Mayen. Österr. Polarstat. Jan Mayen, Beob.-Ergebn. iii, Zool. pp. 39-58.

118. KRAEPELIN, K. Die Fauna der Hamburger Wasserleitung. Abh. Ges. Hamb. ix, 15 pp.

119. KUKENTHAL, W., & WEISSENBORN, B. Ergebnisse eines zoologischen Ausfluges an die Westküste Norwegens. Jen. Z. Nat. xix, p. 776.

List of *Crustacea*, p. 787.

120. *KULCZYCKI, WL. Materyaly do fauny skorupiaków krajowych (Materialen zur vaterländischen Crustaceenfauna). *Asellidae*. Kosmos (Lemberg) x, 1885, pp. 315-323 & 405-417.

121. —. Materyaly do monographi skorupiaków liscionogich (Matériaux pour servir à une Monographie des Crustacés Branchiopodes) —La famille des Branchiopodes. *Op. cit.* xi, 1885, p. 588; abstr. in Arch. slav. Biol. i, p. 467.

Describes *Artemia*, *Branchipus*, *Polyartemia*, *Callaenella*; homologising the appendages with those of *Apus*.

122. LANKESTER, E. R. Professor Claus and the Classification of the *Arthropoda*. Ann. N. H. (5) xvii, p. 364.

Claim for priority in the theory of the phylogeny of the *Arthropoda* enunciated the previous year by Professor Claus. [*Vide* CLAUS (35) (36) (37).]

123. —. Professor Claus; a Rejoinder. *Op. cit.* xviii, pp. 179-182. [*Vide* (122).]

124. LÉGER, M. Deux nouveaux cas de monstruosité chez les Langoustes. Ann. Sci. Nat (7) i, pp. 109-125; also Bull. Soc. Philom. (7) x, pp. 78-81.

125. LEYDIG, F. Der Giftstachel des *Argulus* ein Sinneswerkzeug. Zool. Anz. ix, pp. 660-667.

The author states that the "poison-duct" of the "sting" is formed by the union of two nerve-tubes, and that the whole apparatus is merely a sense-organ.

126. —. Die Hautsinnesorgane der Arthropoden. Zool. Anz. ix, pp. 284-291 & 308-314; abstr. in Biol. Centrbl. vi, p. 462.

The study of the various types shows that all the hairs for tactile, olfactory, poisonous, and other purposes, are modifications of the ordinary hairy covering.

127. LIMNORIA-COMMISSIE, Mededeeling van de. Versl. Ak. Amst. (3) ii, pp. 205-209, 1 pl.

128. *Limulus* in the Pacific. Am. Nat. xx, p. 654.

Possibly imported with lobster eggs from the Atlantic; or perhaps the Japanese sp.

129. LINDSTRÖM, G. Förteckning på Gotlands Siluriska Crustacéer, xlii, No. 6, pp. 37-99, 5 pls.

Over 30 new species and 1 new genus; the new forms only are mentioned in the Systematic Record. Tables of occurrence outside Gotland of the forms mentioned, pp. 93-95.

130. LOVETT, E. Notes on British Stalk-eyed *Crustacea*. Zool. (3) x, p. 170.

Notes on distribution and characters.

131. *LUCAS, H. Note sur le *Bopyrus squillarum*. Ann. Soc. Ent. Fr. (6) vi, Bull. p. cxliv.

132. * —. Sur un nouveau genre de Crustacés (*Ligus*) de Nice. Op. cit. v, Bull. p. ccxix.

133. ** —. Note sur un Crustacé terrestre de l'ordre des Isopodes. Op. cit. iv, Bull. pp. cxxxvii & cxxxviii.

134. MACMUNN, C. A. On Myohæmatin and the Histohæmatins. Phil. Tr. clxxviii, pp. 267-298, 2 pls.

Histohæmatins in *Arthropoda*, p. 272; Myohæmatin in *Crust.* (confined to cardiac muscle), p. 284.

135. —. On the Presence of Hæmatoporphyrin in the Integument of certain *Invertebrata*. J. Physiol. vii, p. 240.

Records its absence in five *Decapoda*, where tetronerythrin was easily obtained.

136. MALCOMSON, S. M. Recent *Ostracoda* of Belfast Lough. P. Belf. Soc. (2) ii, App. ix, pp. 259-262, 1 pl.

Three n. spp. are recorded.

137. MARSHALL, C. F. The Nervous System of the Lobster. Stud. Biol. Lab. Owen's Coll., Manchester, i, 1886, 8vo, pp. 313-323; abstr. in J. R. Micr. Soc. (2) vi, p. 792.

There are no distinct motor and sensory roots, and no marked decussation, other than functional, is recognisable.

138. MATTHEW, G. F. On the Probable Occurrence of the Great Welsh Paradoxides, *P. davidis*, in America. *Am. J. Sci.* (3) xxx, p. 72.
139. —. The Occurrence of *Olenellus* (?) *kjerulfi* in America. *Op. cit.* xxxi, p. 472.
140. —. Illustrations of the Fauna of the St. John Group, III. *Tr. R. Soc. Canada*, iii, sect. 4, pp. 29-84, 3 pls.
141. MCINTOSH, W. C. On Certain Processes formed by *Cerapus* on *Tubularia indivisa*. *Rep. Brit. Ass.* 1885, p. 1072; *Ann. N. H.* (5) xvi, pp. 484 & 485; abstr. in *J. R. Micr. Soc.* (2) vi, p. 70.
142. MIERS, E. J. The *Brachyura* collected by H.M.S. 'Challenger.' *Chall. Rep. Zool.* xvii, 412 pp., 29 pls.
- Introduction, pp. i-iii; systematic classification, pp. iv-xvi; station list, pp. xvii-xxxiii; bathymetric distribution, pp. xxxv-xli; synoptic list of species, pp. xliii-l. Only those species are quoted in the Systematic part of the Record which are new, or to which importance is assigned in the description. Of all the genera quoted, and of many more, full definitions are given, and a list of the known species attached.
143. MILNE-EDWARDS, A. Crustacés du genre *Thelphusa* recueillis par M. de Brazza dans les régions du Congo. *Bull. Soc. Philom.* (7) x, pp. 148-151.
- Diagnoses of 5 n. spp.
- MONTICELLI, F. S. [*Vide* RAFFAELE, F. (172).]
144. MORIÈRE, M. Trilobites de l'étage du Grès de May. *Bull. Soc. L. Norm.* (3) ix, pp. 74-86, 2 pls.
- A n. sp., descriptions and figures of some known forms.
145. *MORIN, J. K' Istoria Razvatia Rietchnaho Raka (Zur Entwicklungsgeschichte des Flusskrebses). *Zapiski Novoross. Obsch.* xi, pp. 1-22, 1 pl.
146. *MUSEUM NORMANIANUM. A Catalogue of the *Invertebrata* of Europe, the Arctic and N. Atlantic Oceans, contained in the collection of the Rev. Canon A. M. Norman. Pt. iii, *Crustacea*, 26 pp. Houghton-le-Spring: 1886, 8vo. [Printed for private circulation.]
147. NINNI, A. P. Sul Gambero fluviale Italiano. *Atti Soc. Ital.* xxix, pp. 322-326.
- Diagnoses of the Italian species.
148. NOETLING, F. Crustaceen aus dem Sternberger Gestein. *Arch. Ver. Mecklenb.* xl, pp. 81-86.
- Account of 1 new and 3 old species.
149. —. Crustaceen-reste aus dem oberoligocänen Sternberger Gestein. *SB. nat. Fr.* 1886, pp. 32-34.
150. NORMAN, A. M., & STEBBING, T. R. On the *Crustacea Isopoda* of the 'Lightning,' 'Porcupine,' and 'Valorous' Expeditions. *Tr. Z. S.* xii, pp. 77-141, 12 pls.
- This first part contains the families *Apseudidae*, pp. 79-102; *Tanaidae*, pp. 102-119; and *Anthuridae*, pp. 119-133. There are several new gg. and spp. Notes on dimorphic males in *Tanaidae*, p. 103.

151. NÓVAK, O. Remarques sur le genre *Aristozoe* (Barr.). SB. böhm. Ges. 1885, pp. 239-243, 1 pl.
Ranges *Aristozoe* with *Ceratiocaridae* among *Phyllopoda*.
152. —. Nouveau Crustacé Phyllocaride de l'étage F-f², en Bohême. *T. c.* pp. 343-347, 1 pl.
With n. g. *Ptychocaris*, ranked under *Phyllocarida*.
153. —. Studien an Hypostomen böhmischer Trilobiten. No. 3. *T. c.* pp. 581-587, 1 pl.
With n. g. *Philipsinella*.
154. NUSSBAUM, J. L'Embryologie d'*Oniscus murarius*. Zool. Anz. ix, pp. 454-458; abstr. in J. R. Micr. Soc. (2) vi, p. 979.
Preliminary notice only. In the main confirms Bobretski's account; but states that the hypoblast does not rise from the yolk cells, but as an independent formation from the original (?) gastrula. Cerebrum and nerve chain are formed separately, the former from four epiblastic thickenings. A horizontal diaphragm is formed, as in *Astacus*.
155. NYE, W. A Reasoning Lobster. Bull. U. S. Fish Comm. vi, p. 186.
156. OEHLERT, D. Étude sur quelques Trilobites du groupe des *Proetidae*. Bull. Soc. Angers, xv, pp. 121-143, 2 pls.
157. —. Description de *Goldius gervillei* (Barrande). *T. c.* pp. 113-119, 1 pl.
158. ÖRLEY, L. Ueber die Entomostraken-Fauna von Budapest. Term. füzetek, x, pp. 7-14, 2 pls.; abstr., pp. 98-105.
With description of a new species of *Notodromas*.
159. PACKARD, A. S. On the Class *Podostomata*. Am. Nat. xx, p. 1060.
[Abstract of paper read before Nat. Ac. Sci.]
New term to supplant *Gigantostroaca*, divided into the orders *Mero-stomata* and *Trilobita*, with suborders.
160. —. Lamellate Thoracic Feet in the *Phyllocarida*. *T. c.* p. 155, & P. Am. Phil. Soc. xxiii, pp. 380-383, 1 pl.
Preliminary note and final memoir on presence of limbs resembling those of *Nebalia* in a form allied to *Ceratiocarid*.
161. —. The Moulting of the Lobster. *T. c.* p. 173; abstr. in J. R. Micr. Soc. (2) vi, p. 242.
162. PATTEN, W. Eyes of Molluscs and Arthropods. MT. z. Stat. Neap. vi, pp. 542-756, 5 pls.; abstr. in J. R. Micr. Soc. 1887, pp. 82-85.
Crustacean eyes, pp. 625-650; *Penæus*, p. 625; *Galathea*, *Palæmon*, *Pagurus*, p. 641; *Branchipus*, *Orchestia*, p. 645; general remarks on the Arthropods, pp. 665-699; origin and function of sense-organs and of animal pigment, pp. 705-727; classification of eyes, pp. 727-732; technique, p. 733; literature, p. 739. [Vide also review in Q. J. Micr. Sci. xxvii, pp. 285-292.]

163. PELSENEER, P. Notice sur un Crustacé des sables verts de Grand-pré. Bull. Mus. Belg. iv, pp. 47-60.

Describes the new Crustacean under the name of *Hoploparia benedeni*, and, after discussing the affinities of the genus, ranks it with the Homarines rather than the Astacines. Proposes to abolish gen. *Oncoparia*, ranking its sole sp., *O. bredai* (Bosquet) under *Hoploparia*.

164. —. Les Crustacés Décapodes du Maestrichtien du Limbourg. *T. c.* pp. 161-176.

Some new spp. described, with a list of all the forms obtained from the deposit.

165. —. *Caridina desmaresti* dans les eaux de la Meuse. *T. c.* pp. 211-222.

Records the capture of this form, new to Belgium; with a general list of all the *Crustacea* known in the country.

166. **PFEFFER, G. Ueber *Aræosternus wieneckii*. Verh. Ver. Hamb. v, pp. 103 & 104.

167. —. Mollusken, Krebse, und Echinodermen von Cumberland-Sund. JB. Hamb. iii, & Ber. Naturhist. Mus. Hamb. 1886.

Crustacea, pp. 44-49 of the second quotation.

168. PLATE, L. Untersuchungen einiger an den Kiemenblättern des *Gammarus pulex* lebenden Ectoparasiten. Z. wiss. Zool. xliii, pp. 175-241, 2 pls.

Dendrocometes, *Spirochona*, *Lagenophrys*, *Calidina*.

169. **PLATEAU, F. Communication (sur des Crustacés de l'île de Chypre). C.R. ent. Belg. (3) xxviii, p. 260.

POPPE, S. A. [*Vide sub* ZACHARIAS (223).]

170. POSTLETHWAITE, J., & GOODCHILD, J. G. Trilobites from the Skiddaw Slates. P. Geol. Ass. ix, pp. 455-469, 4 pls.

1 new genus, 3 new spp.

171. POUCHET, G. Sur les photographies stellaires et les animaux aveugles des eaux profondes. C.R. Soc. Biol. (8) iii, pp. 123-124.

On the existence of light at great depths.

172. RAFFAELE, F., & MONTICELLI, F. S. Descrizione di un nuovo *Lichomolgus* parassita del *Mytilus galloprovincialis*. Atti Acc. Rom. (4) i, pp. 302-307, 1 pl.

Divide the genus into *Lichomolgus*, *Sabelliphilus* (M. Sars), and *Anthesius* (Della Valle). One new species is described. [*Vide* AURIVILLIUS (2).]

173. RATHBUN, R. Notes on Lobster Culture. Bull. U. S. Fish Comm. vi, pp. 17-32.

174. REICHENBACH, H. Studien zur Entwicklungsgeschichte des Flusskrebses. Abh. Senck. Ges. xiv, 1, 137 pp., 14 pls.; abstr. in J. R. Micr. Soc. 1887, pp. 79-82.

In this paper, the importance of which may be gathered from the fact that there are 233 figures, the author gives a very close account of the

development of the Crayfish, from the blastosphere onwards. He divides the period before the escape of the embryo from the egg into ten stages, each of which is fully figured.

175. Report on the Fauna of Liverpool Bay, i, 10 pls., 2 maps; also in P. Liverp. Soc. xl. [*Crustacea: Copepoda*, J. C. Thomson, pp. 201-208; *Cirrhipedia*, F. P. Marratt, pp. 209-211; *Edriophthalmata*, G. H. Fowler, pp. 212-220; *Podophthalmata*, A. O. Walker, pp. 221-226.]

Lists of the species obtained.

176. REUTER, G. Die Beyrichien der obersilurischen Diluvialgeschiebe Ostpreussens. Z. geol. Ges. xxxvii, pp. 621-679, 2 pls.

Account of the genus, and a stratigraphical zone-system determined by species. Several new species are recorded.

177. RICHTERS, F. Ueber zwei afrikanische *Apus*-Arten. Ber. Senck. Ges. 1886, pp. 31-33.

178. ROBERTSON, D. Notes on *Talitrus locusta*. P. N. H. Soc. Glasg. (n.s.) i, p. 130.

Finds that this Amphipod lives a few hours in fresh-water, a few days in salt-water, but shows no tendency to cannibalism.

179. ROUCH, G. Des cellules nerveuses périphériques du système viscéral des Crustacés. C.R. Soc. Biol. (8) iii, pp. 21-27.

Description of regular intra-visceral ganglion cells with anastomoses.

180. RYDER, J. A. Monstrosities among Recently-Hatched Lobsters. Am. Nat. xx, p. 742; abstr. in J. R. Micr. Soc. (2) vi, p. 979.

Double monsters developed similarly to those of fish, and bearing out the conclusions of Rauber.

181. —. Metamorphosis of *Homarus americanus*. Am. Nat. xx, p. 739; abstr. in J. R. Micr. Soc. (2) vi, p. 978.

Finds eight distinct stages in the metamorphosis, a number not agreeing with those recorded by Smith & Dannevig.

182. *SARS, G. O. Nye Bidrag til Kundskaben om Middelhavets Invertebrat-fauna; III. Middelhavets Saxisopoder (*Isopoda Chelifera*), 1886.

183. —. Report on the *Phyllocarida* collected by H.M.S. 'Challenger'. Chall. Rep. Zool. xix, 39 pp., 3 pls.

Introduction, pp. 1 & 2; morphology and phylogeny, pp. 3-5 & 37; definition of the fam., pp. 6 & 7; homologies, pp. 29-36. Ranks the *Phyllocarida* as a sub-section of *Branchiopoda* (= *Phyllopoda* of Claus), of equal value with *Cladocera*, &c.; and inclines to Packard's view that they are descended from Copepod-like ancestors, having no relation to the *Podophthalmata*.

184. —. Report on the *Cumacea* collected by H.M.S. 'Challenger.' Op. cit. xix, 78 pp., 11 pls.

Introduction, pp. 1 & 2; morphology and phylogeny, pp. 3 & 4; definition of families, pp. 5-9. Of the 15 species, only one was previously

known to science; and one necessitates the formation of a new genus. Regards the *Cumacea* as an isolated branch, the ancestor of which may have combined some characters of the *Phyllocarida* and *Trilobita*.

185. —. Australian *Cladocera* raised from Dried Mud. Forh. Selsk. Chr. 1885, 46 pp., 8 pls. [Mentioned in Zool. Rec. xxii, but not then seen by Recorder.]

Author finds "winter eggs" formed to resist the long dry season; and hatched from mud of Gracemere Lagoon, N. Queensland, 5 new spp., bearing a very strong resemblance to European N. forms.

186. —. Norske Nordhavs-Expedition, xv. *Crustacea*, pt. ii, 93 pp., 1 map.

Author gives a list of all the species taken by the expedition, with their stations. Of the total number of 337 species, of which 64 are new, by far the greater number are of Arctic origin.

187. SCHMIDT, O. Sur quelques nouveaux Trilobites. Bull. Pétersb. pp. 501-512, 1 pl.

Description of n. spp. from Eastern Siberia.

188. SCHNEIDER, R. Unterirdische *Gammarus* von Clausthal. SB. Ak. Berlin, 1885, p. 1087; also Abh. z. Programm k. Real-Gymnasiums Berlin, Ostern; abstr. in J. R. Micr. Soc. (2) vi, p. 243.

Gammarus in mines exhibits an intermediate condition between its representatives in caves and the ordinary forms. The Clausthal specimens absolutely pale, and show commencing degradation of eyes; the first antennæ slightly lengthened.

189. SCOTT, T. A Curious Dwelling for a Hermit Crab. P. N. H. Soc. Glasg. (n.s.) i, p. 146.

Pagurus thomsoni living in a sponge which had overgrown the *Turritella* in which he had originally lived.

190. *SENONER, A. Krabben (*Dromia*) und Schwämme. Zool. Gart. xxvii, p. 92.

191. SEGUENZA, G. Il Quaternario di Rizzolo. Nat. Sicil. iv, pp. 33, 55, 116, 157, 204, 214, 250, & 295.

Account of the *Ostracoda*. The n. spp. only are chronicled in the Systematic part.

192. —. Il Quaternario di Rizzolo (continued). *Op. cit.* v, pp. 22, 31, 123, 149, 166, 186, & 238.

193. —. Gli Ostracodi del Porto di Messina. *Op. cit.* iv, pp. 44, 76, & 110.

Only the n. spp. are recorded in the Systematic part, *infra*.

194. —. Gli Ostracodi del Porto di Messina (continued). *Op. cit.* v, p. 57.

195. SHARMAN, G. New Species, *Olenus nuneatonensis* and *Obolella granulata* from the Lower Silurian of Nuneaton. Geol. Mag. (3) iii, p. 565.

196. *SIMON, E. Étude sur les Crustacés du Sous-ordre des Phyllopo-
des. Ann. Soc. Ent. Fr. (6) pp. 393-432, 2 pls.
1 n. sp.; n. subgg. *Siphonophanes*, *Drepanosorus*, *Tanymastix*, *Chiro-
cephali*.
197. *SKUSE, F. A. British Stalk-eyed *Crustacea* and Spiders. London :
1886, 8vo, 128 pp.
198. SMITH, S. X. List of *Crustacea* from Port Burwell. Rep. Geol.
Surv. Canada, 1882-1884, p. 57*dd*.
199. —. Abyssal Decapod *Crustacea* of the 'Albatross' Dredgings in
the North Atlantic. Ann. N. H. (5) xvii, pp. 187-198; Abstract of
Report of U. S. Fish Comm. Also separate copy of latter seen,
101 pp., 20 pls.; also J. R. Micr. Soc. (2) vi, p. 438.
Lists illustrating vertical distribution, and remarks in introduction on
the great size of abyssal *Decapoda*, and on the great size and small
number of the eggs in many species. The external characters of the eyes
are also treated, from which the author infers that, despite a marked
tendency to degeneration in many cases, the evidence derived from their
examination is in favour of the existence of light at great depths.
200. SPARRE-SCHNEIDER, J. *Pontocrates norvegicus* (Boeck) und *Dexa-
mine thea* (Boeck). Nord. Selsk. Skr. 1884, pp. 13-26, 2 pls.
Quoted from a separate copy last year.
201. **——. Undersøgelser af dyrelivet i de arktiske Fjorde. II. *Crus-
tacea* og *Pycnogonida* indsamlede i Kvænangs Fjorden, 1881. Tromsø
Mus. Aarsh. vii, pp. 47-134, 5 pls.
STEBBING, T. R. R. [*Vide* NORMAN (150).]
202. —. New Amphipodous *Crustacea* from Singapore and New Zea-
land. P. Z. S. 1886, p. 4.
Abstract of paper only, which will ultimately appear in Tr. Z. S.
Description of 3 n. spp.
203. STUHLMANN, F. Die Reifung des Arthropoden-Eies. Ber. Frei-
burg. Ges. i, 128 pp., 6 pls.; abstr. by author in Biol. Centralbl. vi,
pp. 397-402.
Chiefly concerned with *Insecta*, but records extrusion of polar body in
ripening eggs of *Moina* and *Polyphemus*. Regards the phenomenon of
extrusion as directly connected with paucity of yolk-material in the egg.
204. —. Beiträge zur Anatomie der inneren männlichen Geschlechts-
organe und der Spermatogenese der Cypriden. Z. wiss. Zool. xlv,
pp. 536-569, 1 pl.
Describes the male organs as consisting of four testis-tubes on each
side, uniting into a vas deferens; a fifth (so-called) testis-tube is only a
blind process of the vas deferens. An account of spermatogenesis from
a syncytium is also given, according to which only one nucleus takes part
in the formation of a spermatozoon, and becomes the central thread.

205. SZIGÉTHY, K. Anatomie, Histologie, und Physiologie der grünen Drüse bei *Astacus fluviatilis*. Ért. Term. Kör. xiv, 2 pls.; abstr. in Math. Nat. Ber. Ung. iii, p. 108.

Consists of a lacunar system, produced by invagination; the green colour in both parts is the result of peculiar granules imbedded in the protoplasm. The blood vessels run between the membranæ propriæ, into the lacunæ of which they empty without capillaries. Both sections communicate with each other and with the reservoir; but the yellow-green section is especially characterized by free uric acid.

206. TERQUEM, M. O. Les Foraminifères et les Ostracodes du Fuller's Earth des environs de Varsovie. Mém. Soc. Géol. (3) iv.

Ostracoda, pp. 91-107, pls. xvii & xviii.

207. —, & E. Foraminifères et Ostracodes de l'Islande et du Sud de la Norvège. Bull. Soc. Z. Fr. xi, p. 329.

List of *Ostracoda*, p. 339.

208. —. Les Entomostracés-Ostracodes du système Oolithique de la Zone à Ammonites Parkinsoni de Fontoy (Moselle). Mém. Soc. Géol. (3) iv, 46 pp., 6 pls.

209. **TÖRNQUIST, S. L. Undersökningar öfver Siljansområdets Trilobitfauna. Lunds Univ. Arskr. xx, pp. 1-104, 3 pls.

210. **TRYBOM, F. Iusekter och andra lägre djur, funna vid flottadt timmer och bland affal från sådant. Ent. Tidskr. vi, pp. 161-168.

211. URBANOWICZ, F. Przyczynek do embryologii raków Widlonogicii (Contributions à l'embryologie des Copépodes). Kosmos (Lemberg) x, pp. 239-259 & 300-314, pls. i-iii; also Izwiestia Warchavskavo Ouniversityeta, 1885, pp. 1-9, pls. i-iii; abstr. in Arch. slav. Biol. i, p. 663; abstr. in J. R. Micr. Soc. 1887, p. 86; abstr. in German, Giesbrecht (77), pp. 19-21.

212. **VALLE, A. Seconda serie di aggiunte al catalogo dei Crostacei parassiti dei pesci del mare Adriatico. Atti Mus. Civico Trieste, vii, pp. 245-247.

213. VARIGNY, H. DE. L'amputation réflexe des pattes chez les Crustacés. Rev. Sci. (3) xii, 1886, ii, p. 309. [*Vide* also pp. 379 & 701, for other letters on the subject.]

214. —. Sur le Tétanos Rythmique chez les muscles d'Invertébrés. Arch. Phys. vii, pp. 151-171.

With tracings obtained by stimulation of muscles of *Portunus* and *Pagurus*.

215. VIGNAL, W. Sur l'endothélium de la paroi interne des vaisseaux des Invertébrés. Arch. Phys. (3) viii, pp. 1-6; C.R. cii, p. 1027.

Studied circulatory system of crayfish; regards it as analogue of lymphatic system of Vertebrates.

216. VOSSELER, J. Die freilebenden Copepoden Württembergs und angrenzender Gegenden. JH. Ver. Württ. xlii, pp. 167-204, 3 pls.

Discusses question as to authenticity of spp., pp. 169-171; anatomical description, pp. 173-184; environment and systematic, pp. 184-186. Only the n. spp. are quoted in the Systematic part. Tabular diagnosis of spp., p. 200.

217. WALCOTT, C. D. Studies on the Cambrian Faunas of North America, II. Bull. U. S. Geol. Surv. xxx.

Crustacea, pp. 146-222.

218. WEISMANN, A. Richtungskörper bei parthenogenetischen Eiern. Zool. Anz. ix, pp. 570-573.

Finds true polar bodies in the summer-eggs of five Phyllopods, which are eventually reabsorbed. The polar body of *Daphnia longispina* is not identical with that described by Leydig.

219. WIELOWIEYSKI, H. DE. Observations sur la Spermatogénèse des Arthropodes. Arch. slav. Biol. ii, pp. 28-36.

WOODWARD, H. [*Vide* JONES (99).]

220. —. Commensals and Parasites of *Meleagrina margaritifera*. P. Z. S. 1886, p. 176.

Records an interesting case in which a male *Pinnotheres* was enclosed in a cyst of pearl.

221. ZACHARIAS, O. Die Ergebnisse einer zweiten faunistischen Excursion an den grossen und kleinen Koppenteich. JB. schles. Ges. lxiii, p. 187.

222. —. Die Zusammensetzung der pelagischen Fauna in den nord-deutschen Seen. Tag. Deut. Nat. Vers. 1886, p. 108. [*Vide* also Zool. Anz. ix, pp. 564-566.]

223. —. Ergebnisse einer zoologischen Excursion in das Glatzer-, Iser-, und Riesen-gebirge. Z. wiss. Zool. xliii, pp. 252-289.

General account of results, pp. 252-270; description of a new *Diaptomus*, pp. 285-289, and pl. x, by S. A. Poppe.

III.—SUBJECT-INDEX.

(Italics indicate Palæontological papers.)

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COMMENSALISM. Chevreux, 31; Fristedt, 65; McIntosh, 141; Plate, 168; Scott, 189; Senoner, 190; Woodward, 220.
ARTIFICIAL CULTIVATION. Dannevig, 46; Rathbun, 173.
AMPUTATION. Hallez, 83; Varigny, 213.
HABITS, &c. Holder, 92; Bourne, 12.
DIMORPHISM. Norman, 150.
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PARASITES ON CRUSTACEA. Plate, 168; Giard, 74.
GENERAL BIOLOGY of Amphipoda. Bronn, 23.
COLOURING MATTERS [*vide sub* PHYSIOLOGY, Blood; and MacMunn, 135].

IV.—SYSTEMATIC.

DECAPODA.

- Spermatogenesis, Gilson (78).

BRACHYURA.

Vide Miers, in 'Challenger,' (29) pp. 585-592.

Carapax and sternum of *Decapoda*; Ayers (3).

Encephaloides, n. g., omitted in Zool. Rec. xxii; *vide* Wood-Mason (161) of that Record.

CALAPPIDÆ.

Calappa depressa, n. sp., Miers, (142), p. 287.

Paracyclois, n. g., with sole n. sp. *milne-edwardsii*, *id.* p. 288.

Mursia curtispina, n. sp., *id.* p. 291.

CANCRIDÆ.

Lophozymus bellus (Stimpson) var. *leucomanus*, Miers, (142) p. 115.

Medæus haswelli, sp. n., *id.* p. 117.

Actæa hystrix, n. sp., *id.* p. 121.

Xantho bidentatus (M.-Edw.), *id.* p. 126.

Pseudozius to contain n. subg. *Euryozius*; *E.* (= *Xantho*) *bouvieri* (M.-Edw.) var. *mellissii* (Miers), *id.* p. 142.

Sphærozius nitidus (Stimps.), *id.* p. 144.

Pilumnus braziliensis, n. sp., *id.* p. 151; *floridanus*, *id.* p. 152; *minutus* (De Haan) var. *hirsutus* (Stimpson); *dehaani* (Miers), *id.* p. 155; *normani*, n. sp., *id.* p. 156; *longicornis* (Hilgendorf) var. ?, *id.* p. 157; *vestitus* (Hasw.), *id.* p. 159; *tomentosus* (Latreille), *id.* p. 160; *rufopunctatus* (Stimpson), *id.* p. 160.

Trapezia rufopunctata (Herbst) var. n. *intermedia*, *id.* p. 168.

Heterozius rotundifrons (M.-Edw.), Filhol, (59) p. 372.

Pilumnus spinosus, n. sp., Filhol, (59) p. 377; *vespertilio* (M.-Edw.), *id.* p. 374; *tomentosus* (Latr.), *id.* p. 375; *novæ-zelandiæ*, n. sp., *id.* p. 375.

Panopæus otagoensis, sp. n., *id.* p. 379.

CORYSTIDÆ [= CORYSTOIDEA (Dana)].

Hypopeltarium, n. g., with sole sp. *spinosulum* (White) = *Atelecyclus* *spin.* or *Peltarion spin.* (White); Miers, (142) p. 210.

DORIPPIDÆ.

Ethusa orientalis, n. sp., Miers (142) p. 330.

Ethusina challengerii, n. sp., *id.* p. 331; *gracillipes*, n. sp., *id.* p. 332.

GEOCARCINIDÆ.

Geocarcinus lagostoma (M.-Edw.), Miers, (142) p. 218.

GRAPSIDÆ.

Cyclograpsus lavauxi (M.-Edw.), Filhol, (59) p. 390.

Halicarcinus huttoni, n. sp., *id.* p. 398.

INACHIDÆ.

Stenorhynchus phalangium at Penzance, Cornish, Zool. (3) x, p. 251 ; appendages reduced by *Sacculina*, Giard (74) ; *S. fulcifer* (Stimpson), Miers, (142) p. 6 ; *spinifer*, n. sp., *id.* p. 7 ; list of known spp., *id.* p. 6.

Achæus, list of known spp., *id.* p. 8 ; *tenuicollis*, n. sp., *id.* p. 9.

Platymaia, n. g., with sole n. sp., *wyville-thomsoni*, *id.* p. 12.

Cyrtomaia, n. g., *id.* p. 14 ; *C. murrayi*, n. sp., *id.* p. 15 ; *suhmii*, n. sp., p. 16.

Achæopsis spinulosus (Stimpson), Miers, (142) p. 18.

Eurypodius latreillei (Guér. Ménév.), *id.* p. 22 ; *longirostris*, n. sp., *id.* p. 23.

Anamathia pulchra, n. sp., *id.* p. 26.

Lispognathus thomsoni (Norman), *id.* p. 27.

Ergasticus naresii, n. sp., *id.* p. 30.

Echinoplax, n. g., with sole n. sp. *moseleyi*, *id.* p. 31.

Oxypleurodon, n. g., with sole n. sp. *stimpsoni*, *id.* p. 38.

Pugettia velutina, n. sp., *id.* p. 41.

LEUCOSIIDÆ.

Iliacantha intermedia, n. sp., Miers, (142) p. 302.

Ebalia (*Phlyxia*) *intermedia*, n. sp., *id.* p. 308 ; *quadridentata*, n. var. *spinifera*, *id.* p. 309 ; *dentifrons*, n. sp., *id.* p. 310.

Randallia granulata, n. sp., *id.* p. 317.

Leucosia australiensis, n. sp., *id.* p. 322 ; *haswelli*, n. sp., *id.* p. 324.

Phlyxia cheesmanii, n. sp., Filhol, (59) p. 407.

MAJIDÆ.

Herbstia rubra (M.-Edw.), Miers, (142) p. 49 ; *H. (Herbstiella) depressa* ? (Stimpson), *id.* p. 51.

Chlorinoides coppingeri (Hasw.), *id.* p. 53.

Hyastenus elegans, n. sp., *id.* p. 58.

X/ *Nastia hystrix*, n. sp., *id.* p. 60.

Scyra compressipes (Stimpson), *id.* p. 63.

Notolopas brasiliensis, n. sp., *id.* p. 64.

Micippa spinosa var. *affinis* (Miers), *id.* p. 70.

OCYPODIDÆ.

Geryon (?) *incertus*, n. sp., Miers, (142) p. 224.

Pilumnoplax heterochir (Studer), *id.* p. 227 ; *abyssicola*, n. sp., *id.* p. 228.

Bathyplox typhlus (M.-Edw.) n. var. *oculiferus*, *id.* p. 230.

Litocheira kingsleyi (Miers), *id.* p. 232.

Ceratoplax ciliata (Stimps.), *id.* p. 234.

Gonoplax sinuatifrons, n. sp., *id.* p. 246.

Ommatocarcinus huttoni, n. sp., Filhol, (59) p. 384.

Gelasimus huttoni, n. sp., *id.* p. 386.

PARTHENOPIDÆ.

Lambrus, revision of the genus, Miers, (142) pp. 91-101; *nodosus* (Luc.), Filhol, (59) p. 370.

Eurynolambrus australis (M.-Edw.), *id.* p. 371.

PERICERIDÆ.

Libinia smithii, n. sp., Miers, (142) p. 73; *gracilipes*, n. sp., p. 74.

Picroceroides, n. g., with sole n. sp. *tubularis*, *id.* p. 77.

Macroœloma concava, n. sp., *id.* p. 81.

Mithrax, with subgg. *Nemausa* and *Mithrax*, *id.* pp. 84-90.

Paramithrax minor, n. sp., Filhol, (59) p. 356; *cristatus*, n. sp., *id.* p. 358.

Leptomithrax australis (Miers), *id.* p. 361; *longimanus* (Miers), *id.* p. 364.

Acanthophrys filholi (M.-Edw.), *id.* p. 365.

Prionorhyncus edwardsii (Luc.), *id.* p. 367.

PINNOTHERIDÆ.

Pinnotheres enclosed in pearl, Woodward (220); *P. villosulus* (Guér. Ménév.), Miers, (142) p. 277; *novæ-zelandiæ*, Filhol, (59) p. 407.

Hymeniscus edwardsi, n. sp., Filhol, (59) p. 400; *cooki*, n. sp., *id.* p. 401; *haasti*, n. sp., *id.* p. 402.

Elamene longirostris, n. sp., *id.* p. 403; *producta* (Kirk), *id.* p. 404; *kirki*, n. sp., *id.* p. 405.

PORCELLANIDÆ.

Petrolisthes novæ-zelandiæ, n. sp., Filhol, (59) p. 408.

Porcellanides, n. g., between *Porcellana* and *Porcellanella*, for spp. *longimana* (Risso), *minuta* (Westwood), *rissoi*, n. sp.; Czerniavsky, (40) p. 112.

PORTUNIDÆ.

Neptunus, with subgg. *Amphitrite*, *Achelous*, *Hellenus*, Miers, (142) pp. 171-183; *N. (A.) spinipes*, n. sp., *id.* p. 178.

Lupocyclus (Parathranites) orientalis, n. sp., *id.* p. 186.

Cronius bispinosus, n. sp., *id.* p. 188.

Goniosoma variegatum (Fabr.) n. var. *bimaculatum*, *id.* p. 191.

Thalamita intermedia, n. sp., *id.* p. 196; *sexlobata*, n. sp., *id.* p. 196.

Platyonychus iridescens, n. sp., *id.* p. 202.

Lissocarcinus lævis, n. sp., *id.* p. 205.

THELPUSIDÆ.

Thelphusa brazzae, n. sp., Milne-Edwards, (143) p. 148; *pœcilei*, *ballayi*, n. spp., *id.* p. 149; *chavanesii*, *decazei*, n. spp., *id.* p. 150; *intermediu*, n. sp., Czerniavsky, (40) p. 148.

PALÆONTOLOGY.

Goniochirus cristatus, n. sp., Carter, (28) p. 555.

Ranina cretacea, n. sp., Dames, (47) p. 553.

MACRURA.

Vide Henderson, in 'Challenger,' (29) pp. 897-901, and Sp. Bate, in eod. pp. 522-528.

ASTACIDÆ.

Astacus: development of, Reichenbach (174), Morin (145); sense of touch in, Gulland (82); glycogen in tissues, Kirch (114); green gland, Szigéthy (205); endothelium of circulatory system, Vignal (215).

Cambarus nais, Faxon, (57) p. 140; *neglectus*, *id.* p. 142: both n. spp.

Homarus americanus: moulting of, Packard (161); metamorphosis of, Ryder (181); monstrosities, Ryder (180), Leger (124); artificial cultivation, Dannevig (46), Rathbun (173).

CARIDIDÆ.

Crangon: notes on British species of, Lovett, (130) p. 170; development of eye, Kingsley, (111) (112).

Alpheus ruber, from the Channel Islands, description and account of stridulation; Lovett, (130) p. 173.

Caridina desmaresti (Millet, sp.) in the Meuse; Pelseneer (165).

Alpheus, development of, Herrick (89); *similis*, n. sp., Czerniavsky, (40) p. 26.

Athanas alpheoides, n. sp., *id.* p. 26.

Leander brandti, n. sp., Czerniavsky, (40) p. 43; phylogenetic table of species, *id. ibid.*

Lysmata aberrans, n. sp., *id.* p. 63.

Steiracrangon orientalis, n. sp., *id.* p. 73.

Virbius tenuirostris, *rectifrons*, n. spp., *id.* p. 20.

Hippolyte amazo, n. sp., Pfeffer (167).

GALATHEIDÆ.

Grimothea novæ zelandiæ, n. sp., Filhol, (59) p. 426.

MIERSIDÆ.

Notostomus vascus, n. sp., Smith, (199) p. 72.

Hymenodora gracilis, n. sp., *id.* p. 76.

PAGURIDÆ.

Pagurus thomsoni in a sponge, Scott (189); *prideauxi* and commensals, Chevreux (31).

- Birgus latro* climbing palm trees; Bourne (12).
Eupagurus edwardsii, Filhol, (59) p. 412, *kirki*, p. 416, *cooki*, p. 417, *stewarti*, p. 418, *hectori*, p. 419, *campbelli*, p. 421, *traversi*, p. 422, *thompsoni*, p. 423: all new to science.
Clibanarius cruentatus, *id.* p. 424.
Porcellanopagurus edwardsii, *id.* p. 410.
Revision of Brit. sp. of this family, Henderson (87).

PENÆIDÆ.

- Benthesicymus*? *moratus*, n. sp. dub., Smith, (199) p. 90.

PALÆONTOLOGY.

- Hoploparia benedeni*, n. sp., Pelseneer, (163) p. 47.
Oncoparia, sole sp. to be placed under *Hoploparia*, *id.* p. 57; *vide* also *id.* (164) p. 164.
Ischnodactylus, n. g., to include *I. (Hoploparia) macroductyla* and *I. inequidens*, n. sp., *id.* (164) p. 162.
Galathea ubaghsii, n. sp., *id.* p. 169.
Eryon sublevis, n. sp., Carter, (28) p. 545; *georgii*, n. sp., *id.* p. 549;
E. ? pulchella, n. sp., *id.* p. 550.
Glyphea hispida, n. sp., *id.* p. 550.
Magila levimana, n. sp., *id.* p. 552; *dissimilis*, n. sp., *id. ibid.*
Penæus septemspinatus, n. sp., Dames, (47) p. 554.
Ibacus precursor, n. sp., *id.* p. 555.
Palæocrangon sociale, Kinnear (113).

LEPTOSTRACA.

- Vide sub PHYLLOPODA—PHYLLOCARIDA and PALÆONTOLOGY*, p. 38.

SCHIZOPODA.

- Vide* Sars in 'Challenger,' (29) p. 739.
Spermatogenesis, Gilson (78).
Euphausia inermis, or "Kril," as food of *Balenoptera borealis*; Collett, (38) p. 263.
Mysis, n. sp. innom., Braun (20).

STOMATOPODA.

- Vide* Brooks in 'Challenger,' (29) p. 817.
Spermatogenesis, Gilson (78).
Gonodactylus, gen. restricted, Brooks, (22) p. 55; *G. chiragra* (Latreille) described and figured, *id.* p. 56; *graphurus* (Miers), *id.* p. 58; *glabrous*, n. sp., *id.* p. 62; *Gonerichthus* larva of this genus, *id.* p. 113.

Protosquilla, n. g., erected from *Gonodactylus*, Brooks, (22) p. 65 ; *elongata*, n. sp., *id.* p. 67 ; *folinii* (M.-Edw.), *id.* p. 70 ; *trispinosa* (White), *id.* p. 71 ; *cerebralis*, n. sp., *id.* p. 72, possibly identical with *glyptocerca* (Wood-Mason) ; *guerinii* (White), *id.* p. 75.

Coronida, n. g., erected from *Gonodactylus*, Brooks, (22) p. 79, to include *bradyi* (M.-Edw.) and *trachura* (Miers) ; larva of the genus, *id.* p. 110.

Pseudosquilla ciliata (Miers), Brooks, (22) p. 53 ; larva of the gen. described as *Pseuderichthus*, *id.* pp. 111-113.

Lysiosquilla maculata (Fabricius), Brooks, (22) p. 45, described and figured ; *L. (Coronis) excavatrix*, n. sp., *id.* p. 48, with account of its habits ; the larva of this gen. described as *Lysioerichthus*, *id.* pp. 99-110.

Squilla quinquedentata, n. sp., Brooks, (22) p. 26 ; *S. leptosquilla*, n. sp., *id.* p. 30 ; *lata*, n. sp., *id.* p. 34 ; *fasciata* (De Haan) described and figured, *id.* p. 37 ; *chlorida*, n. sp., *id.* p. 40.

Squilla, relation of *Alima* larva to, *id.* pp. 81-95 ; of *Alimerichthus* larva to, *id.* pp. 95-98.

PALÆONTOLOGY.

Sculda syriaca, n. sp., Dames, (47) p. 558.

Pseuderichthys cretaceus, *id.* p. 571

Protozoa hildendorffii, *id.* p. 571.

} new larval forms.

AMPHIPODA.

Vide Stebbing in 'Challenger,' (29) pp. 618-622.

GAMMARINA.

GAMMARIDÆ.

Byblis kallarthrus, n. sp., Stebbing, (202) p. 4.

Pherusa (?) *cærulea*, n. sp., *id.* p. 5.

Gammarus, alterations in mine forms, and *pulex* n. var. *subterraneus*, Schneider (188) ; commensals on, Plate (168).

Menigrates (*Orchomene* ?) *arcticus*, n. sp., Sparre-Schneider, (201) p. 63.

Metopa sølsbergi, n. sp., *id.* p. 71.

Monoculodes tessellatus, n. sp., *id.* p. 81.

ORCHESTIDÆ.

Talitrus locusta, experiments on duration of life in fresh and salt-water ; Robertson (178).

Talorchestia tumida, n. sp., Stebbing, (202) p. 5, with dimorphic males ; *cooki*, n. sp., Filhol, (59) p. 459 ; *armata*, n. sp., *id.* p. 460.

Orchestia dentata, n. sp., Filhol, *id.* p. 462 ; *ornata*, n. sp., *id.* p. 463.

Allorchestes stewarti, n. sp., *id.* p. 465 ; *campbellica*, n. sp., *id.* p. 466.

THAUMATOPSIDÆ, n. fam.

Thaumatops (W.-Suhm emend.) = *Cystosoma* (Guérin-Ménéville), and includes four spp.: *neptunus* (G.-Ménév.), p. 6; *pellucida* (W.-Suhm), p. 8; *loveni*, n. sp., p. 10; *longipes*, n. sp., p. 13. Bovallius (14).

HYPERINA.

Paraphronima clypeata, *californica*, *edwardsii*, n. spp.; Bovallius, (16) p. 11.

Tyro (M.-Edw.) to replace *Clydonia* (Dana), as having priority; preliminary descriptions of n. spp., *clausii*, *atlantica*, *marginata*, *sarsii*, *tullbergii*; *id.* pp. 12-16.

Tauria (Dana) to be restored, since 1862 ranked under *Hyperia*; *id.* p. 16.

Lanccola (Say) replaced as a distinct genus, though ranked by Sp. Bate in 1862 under *Vibilia*; and to include *L. loveni*, *sayana*, *felina*, *serrata*, *curticeps*, *clausii*, nn. spp.: Bovallius, (16) pp. 1-8.

Daira (M.-Edw.) perhaps identical with *Paraphronima* (Claus); Bovallius, (16) p. 8.

ISOPODA.

Vide Beddard in 'Challenger,' (29) pp. 878-882.
Spermatogenesis, Gilson (78).

ANCEIDÆ.

Anceus bathybius, Beddard, (5) p. 119, (6) p. 135; *gigas*, (5) p. 120, (6) p. 137; *tuberculosus*, (5) p. 120, (6) p. 139; *latidens*, (5) p. 120, (6) p. 141; all n. spp.

ANTHURIDÆ.

Paranthura chiltoni, n. sp., Beddard, (6) p. 143; *neglecta*, n. sp., *id.* p. 144; *nigropunctata* (Luc.), Norman, (150) p. 129; *tenuis*-(Sars), *id.* p. 131.

Anthura gracilis (Mont.), Norman, (150) p. 122, of which the male perhaps = *A. (Ptilanthura) tenuis* (Harger).

Cyathura carinata (Kröy.), *id.* p. 124.

Anthelura elongata (Norm.), *id.* p. 126; *abyssorum*, n. sp., *id.* p. 127.

Hyssura producta, n. sp., *id.* p. 128.

Calathura brachiata (Stimps.), *id.* p. 131.

APSEUDIDÆ.

Apseudes antarctica, n. sp., Beddard, (5) p. 114, (6) p. 109; *talpa* (Mont.), Norman, (150) p. 81; *latreillei* (M.-Edw.), *id.* p. 82; *spinosus* (Sars), *id.* p. 85; *uncidigitatus*, n. sp., *id.* p. 87; *obtusifrons*, n. sp., *id.*

p. 88; (*lunarifrons*, n. sp.) = *echinatus* (Sars), *id.* pp. 89 & 134; *simpli-cirostris*, n. sp., *id.* p. 91; *grossimanus* (Norm.), *id.* p. 93; *gracilis*, n. sp., *id.* p. 95; *clausii*, n. sp., Boas, (9) p. 109.

Typhlapseudes, n. g., with sole n. sp., *T. nereus*, Beddard, (5) p. 115, (6) p. 111.

Leiopus, n. g., with sole n. sp., *L. leptodactylus*, *id.* (5) p. 116, (6) p. 115.

Sphyrapus, n. g. [*vide* Zool. Rec. xxii, *Crust.* p. 23], Norman, (150) p. 97; with *malleolus*, n. sp., p. 98; *tudes*, n. sp., p. 99; *anomalus* (Sars), p. 101.

ARCTURIDÆ.

Arcturus myops, Beddard, (5) p. 106, (6) p. 100; *anna*, (5) p. 107, (6) p. 91; *cornutus*, (5) p. 108, (6) p. 93; *brunneus*, (5) p. 108, (6) p. 97; *purpureus*, (5) p. 109, (6) p. 96; *spinifrons*, (5) p. 109, (6) p. 94; *spinosus*, (5), p. 110, (6) p. 88; *glacialis*, (5) p. 111, (6) p. 86; *abyssicola*, (5) p. 111, (6) p. 98; *studerii*, (5) p. 111, (6) p. 100; *oculatus*, (5) p. 112, (6) p. 102; all being n. spp.: *furcatus* (Studer), *id.* (6) p. 85; *americanus*, n. sp., *id.* p. 104; *stebbingi*, n. sp., *id.* p. 105.

Astacilla marionis, n. sp., Beddard, (6) p. 107.

ASELLIDÆ.

Stenetrium haswelli, n. sp., Beddard, (5) p. 103, (6) p. 9.

Iolanthe, n. g., allied to *Acanthoniscus* (Sars); with sole n. sp., *acanthonotus*, *id.* (5) p. 104, (6) p. 15.

Janira abyssicola, n. sp., and *tristani*, n. sp., *id.* (5) p. 105, (6) p. 6.

Jæropsis marionis, n. sp., the second recorded, *id.* (5) p. 105, (6) p. 20.

Janthopsis, n. g., to include only (*Ianthe*) *bovallii* (Studer), *id.* (6) p. 13.

Jæra pubescens (Dana) described and figured, Beddard, (6) p. 19.

Trichopleon, n. g., with sole n. sp. *ramosum*, *id.* (5), p. 106, (6) p. 21.

Asellus angarensis, p. 23, *baicalensis*, p. 51, n. spp., Dybowski, (55); *aquaticus* n. var. *cracoviensis*, *goplanus*, n. sp., with n. var. *switeziana*, Kulczycki, (120) pp. 410-413.

Henopomus (Krøyer) ranked under *Janira*, Bovallius, (15) p. 1.

Jænna, n. g., erected from *Jæra*, to include *J. longicornis* (Lucas) and *filicornis* (Grube), *id.* p. 22.

Jathrippra, n. g., erected from *Janira*, for sole sp. *J. longicauda* (Chilton), *id.* p. 31.

Jais, n. g., to include *Jais hargerii*, n. sp., and *J. (Jæra) pubescens* (Dana), *id.* p. 50.

Munna maculata, *pallida*, n. spp., Beddard, (5) p. 98, (6) pp. 25 & 26.

Ischnosoma bacillus, *id.* (5) p. 98, (6) p. 42; *bacilloides*, (5) p. 99, (6) p. 45; *spinosum*, *id.* (5) p. 99, (6) p. 40; *thompsoni*, (6) p. 169.

Astrurus, n. g., with sole n. sp. *crucicauda*, *id.* (5) p. 100, (6) p. 37.

Neasellus, n. g., with sole n. sp. *kerquelenensis*, *id.* (5) p. 101, (6) p. 34.

Pleurogonium albidum, n. sp., *id.* (5) p. 101, (6) p. 28; *serratum* and *minutum*, n. spp., *id.* (5) p. 102, (6) pp. 30 & 32.

Acanthomunna, n. g., with sole n. sp. *proteus*, *id.* (5) p. 103, (6) p. 47.

Cepon, remarks on the genus, Giard (71).

BOPYRIDÆ.

Bopyrus squillarum, Lucas (131).

CYMOTHOIDÆ.

Anuropus, n. g., characterized by conversion of all abdominal appendages into respiratory organs, with sole n. sp. *A. branchiatus*, Beddard, (5) p. 113, (6) p. 152.

Ceratothoa huttoni, n. sp., Filhol, (59) p. 446; *novæ-zelandiæ*, n. sp., *id.* p. 449.

Livoneca stewarti, n. sp., *id.* p. 450.

Nerocila trailli, n. sp., *id.* p. 451.

Æga maorum, n. sp., *id.* p. 452.

Cirolana cookii, n. sp., *id.* p. 455.

Ononia, n. g., for *Cymothoa amurensis* (Gerstf.), Fiszner, (62) p. 458.

ENTEROPSIDÆ.

Enteropsis pilosus, n. sp., Canu, (26) p. 365.

ENTONISCIDÆ.

Entione, remarks on the gen., Giard (70).

Entoniscus mænadiæ, n. sp., Giard, (75) p. 1034; *kossmanni* (on *Portunus variegatus*), n. sp., and *fraissi* (on *P. holsatus*), n. sp., *id.* (72).

IDOTHEIDÆ.

Idothea stewarti, n. sp., Filhol, (58) p. 34.

MUNNOPSISIDÆ.

Munnopsis gracilis (Beddard), Beddard, (6) p. 51; *australis* (*id.*) *id.* p. 53; *latifrons*, (*id.*) *id.* p. 56.

Eurycope sarsii (*id.*), *id.* (6) p. 58; *novæ-zelandiæ* (*id.*), *id.* p. 61; *fragilis* (*id.*), *id.* p. 63; *atlantica* (*id.*), *id.* p. 66; *E. (?) spinosa* (*id.*) *id.* p. 68; *intermedia* (*id.*), *id.* p. 69; *pellucida* (*id.*), *id.* p. 71; *abyssicola* (*id.*) *id.* p. 74.

Ilyarachna quadrispinosa, n. sp., Beddard, (6) p. 76.

Acanthocope spinicauda (Beddard), *id.* p. 79; *acutispina*, (*id.*) *id.* p. 82.

Macrostylis latifrons, n. sp., *id.* (6) p. 173.

ONISCIDÆ.

Hemioniscus parasitic on *Serolis*; Beddard, (6) p. 175.

Oniscus novæ-zelandiæ, n. sp., Filhol, (59) p. 441; *cooki*, n. sp., *id.* p. 442; embryology, Nussbaum (154).

Philoscia novæ-zelandiæ, n. sp., *id.* p. 444; *violacea*, n. sp., *id.* p. 445.

Armadillidium tigris, *grandinatum*, *mareoticum*, *badium*, *hirtum*, n. spp., Budde-Lund, (24) pp. 50-74 ; *quinque-pustulatum*, *serratum*, *muricatum*, *fissum*, n. spp., *id.* pp. 294-298.

Armadillo bidens, *grossus*, *orbicularis*, *clausus*, *parvus*, *pisum*, *mucidus*, *nigrinus*, *bifrons*, *multipunctatus*, *ruficornis*, *misellus*, *obscurus*, *sodalis*, *pubescens*, *exilis*, *aculeatus*, *translucidum*, *rugosus*, n. spp., *id.* pp. 16-42 & 282-291.

Armadilloniscus candidus, n. sp., *id.* p. 238.

Deto acinosa, n. sp., *id.* p. 235.

Eubelum, n. g., with n. sp. *lubricum*, *id.* p. 292.

Ligia cinerascens, n. sp., *id.* p. 265 ; *gracilipes*, n. sp., *id.* p. 270.

Ligidium cursorium, *fragile*, *tenue*, n. spp., *id.* pp. 256-258.

Oniscus simonii, (*Philoscia*) *exigua*, *vilis*, *annulicornis*, *pygmæa*, *angusticauda*, *mina*, (*Alloniscus*) *brevis*, *pigmentata*, (*Lyprobius*) *lentus*, *modestus*, (*Scyphax*) *setiger*, n. spp., *id.* pp. 205-232.

Peryscyphis (*nec Cercocytonus*, n. g.) *albescens*, *convexus*, n. spp., *id.* pp. 43 & 44.

Porcellio (*Cylisticus*) *mitis*, *rotabilis*, *dentifrons*, *carinatus*, *emaciatius*, *bistriatus*, *spretus*, *trachealis*, *longipennis*, *interpolator*, *planarius*, *brevipennis*, *ficulneus*, *ingenuus*, *maculipes*, *longicauda*, *spinipennis*, *montanus*, *granuliferus*, *blattarius*, *parvus*, *uljanini*, *scitus*, *albinus*, *imbutus*, *angustulus*, *simulator*, (*Hemilepistus*) *pectinatus*, *nodosus*, (*Metoponorthus*) *parvulus*, *meleagris*, *rectifrons*, *tingitanus*, *linearis*, *levigatus*, *politulus*, *litoralis*, *parcus*, *instinctus*, *approximatus*, *lacteolus*, *sabuleti*, *simplex*, *fuscomarmoratus*, *madagascariensis*, *peregrinus*, (*Leptotrichus*) *tauricus*, *squamatus*, (*Bathytropa*) *costata*, n. spp., *id.* pp. 77-198 ; *P. rhinoceros*, *præustus*, *purpureus*, *succinctus*, *tardus*, *pauper*, n. spp., *id.* pp. 301-306.

Rhyscotus, n. g., for *Stenomacrus*, *id.* p. 191.

Scleropuctes, n. g., with n. spp. *concinus*, *peruvianus*, *incisus*, *id.* pp. 240 & 241.

Syspastus, n. g., for *Helleria* (Elner), *id.* p. 280.

Trichoniscus cavernicola, n. sp., *id.* p. 246.

Tylos opercularis, *niveus*, n. spp., *id.* pp. 277 & 278.

SPHÆROMIDÆ.

Critical remarks on the family, Beddard, (6) p. 145.

Cymodocea abyssorum, n. sp., *id.* (5) p. 114, (6) p. 150 ; *bituberculata*, n. sp., Filhol, (59) p. 457.

Nesæa and *Cilicæa* to be ranked under *Cymodocea* ; Beddard, (6) p. 145.

Ceratocephalus grayanus (White, MS.), *id.* (6) p. 148.

TANAIDÆ.

Observations on male dimorphism in the family ; Norman, (150) p. 103.

Tanais hirsutus, n. sp., Beddard, (5) p. 116, (6) p. 120 ; *willemoesii* (Studer), *id.* (6) p. 119.

Typhlotanais kerguelensis, n. sp., *id.* (5) p. 117, (6) p. 121 ; *brachyurus*, n. sp., *id.* (5) p. 117, (6) pp. 123 & 169.

- Neotanaïs*, n. g., with sole n. sp., *N. americanus*, *id.* (5) p. 117, (6) p. 124
Leptognathia australis, n. sp., *id.* (5) p. 118, (6) p. 127.
Paratanaïs dimorphus, n. sp., *id.* (5) p. 119, (6) p. 130.
Bathytanaïs?, n. g., with n. sp. *bathybrotos* (= *Paratanaïs bath.*), *id.* (5) p. 119, (6) p. 133.
Alaotanaïs, n. g., Norman, (150) p. 111, with n. spp. *serratispinosus*, p. 111, *hastiger*, p. 113, *laevispinosus*, p. 115.
Strongylura arctophylax, n. sp., *id.* p. 116.
Tanaella, n. g., *id.* p. 117, with sole n. sp. *unguicillata*, p. 118.

PALÆONTOLOGY.

- Palaega anconaeta*, n. sp., Andrussow, (1) p. 167.
Spheroma (Cymodocea) sarmatica, n. sp., *id.* p. 155.

PHYLLOCARIDA.

Vide sub PHYLLOPODA—*PHYLLOCARIDA*, and PALÆONTOLOGY, p. 38.

PHYLLOPODA.

For some n. subgg. not quoted *infra*, *vide* Simon (196).
 Polar bodies in parthenogenetic ova ; Stuhlmann (203), Weismann (218).

BRANCHIOPODA.

APODIDÆ.

- Lepidurus viridulus* (Tate), Brady, (17) p. 87; *kozubowskii*, Fiszser (61).
Apus namaquensis, n. sp., *abyssinicus* (Rüppell), Richters (177); *varsoviensis*, *haliciensis*, *lubliniensis*, n. spp., Fiszser (61).

BRANCHIPODIDÆ.

- Callaonella*, n. g., for *C. (Artemia) jelskii* (Grube), Kulczycki, (121) p. 591.
Branchipus and *Artemia*, anatomy and points of contrast ; Brauer (19), Claus (32) (33) (34).

ESTHERIDÆ.

- Estheria lutraria*, n. sp., Brady, (17) p. 85 ; *packardi*, n. sp., *id.* p. 85.
Eulimnadia rivolensis, n. sp., Brady, (17) p. 87.
Limnadia hislopi (Baird) described and figured by Brady, (18) p. 294.
filomatica, n. sp., Herrera, (88) p. 156.
Limnetis tatei, n. sp., Brady, (17) p. 84.

PHYLLOCARIDA.

Paranebalia longipes (W.-Suhm), Sars, (183) p. 10.

Nebaliopsis, n. g., with sole n. sp. *typica*, *id.* p. 22.

Vide also Sars, in 'Challenger,' (29) p. 743.

CLADOCERA.

DAPHNIDÆ.

Ceriodaphnia cornuta, n. sp., Sars, (185) p. 26.

Daphnia lumholtzii, n. sp., N. Queensland, with description of its ephippium, Sars, (185) pp. 9 & 18; *curvirostris*, n. sp., Eylmann, (56) p. 17; *serrulata*, n. sp., Daday (43) p. 24.

Macrothrix sericaudata, n. sp., *id.* p. 21.

Moina submucronata, n. sp., Brady, (18) p. 294; *propinqua*, n. sp., very close to *M. brachiata*, Sars, (185) p. 29.

LYNCÆIDÆ.

Alona acanthocercoides (Fischer) figured by Brady (18).

Leydigia australis, n. sp., resembling *L. acanthocercoides*, Sars, (185) p. 35.

Pleuroxus balatonicus, n. sp., Daday, (41) p. 182.

Acroperus transsylvanicus, n. sp., *id.* (43) p. 21.

LYNCODAPHNIDÆ.

Ilyocryptus halyi, n. sp., Brady, (18) p. 294.

Macrothrix triserialis, n. sp., *id.* p. 295.

POLYPHEMIDÆ.

Leptodora occurring in America; Forbes (63).

SIDIDÆ.

Diaphanosoma excisum, n. sp., resembling *D. brachyurum* and *brandtianum*, N. Queensland; Sars, (185) p. 13.

PALÆONTOLOGY.

Oeratiocaris, account of the various spp., Jones, (99) pp. 334-352; *C. gobiiformis*, n. sp., *id.* p. 347; thoracic limbs in an ally of, Packard (160); extra-British spp., Jones, (99) pp. 354-357.

Physocaris vesica, Jones, (99) p. 353.

Acanthocaris, *id.* p. 353.

Aristozoe, *Orozoe*, *Callizoe*, *Nothozoe*, *id.* p. 358. *Aristozoe*, Novák, (151) p. 239.

- Echinocaris*, Jones, (99) p. 353.
Ptychocaris, n. g., Novák, (152), p. 343; with n. spp. *parvula*, *simplex*, p. 345.
Protocaris marshi (Walcott), Walcott, (217) p. 148.
Dithyrocaris glabra, Kinnear (113).

OSTRACODA.

Vide Brady in 'Challenger,' (29) p. 846.

CYPRIDÆ.

- Pontocypris nitida*, n. sp., Brady, (18) p. 303.
Bairdia tenera, n. sp., *id.* p. 304.
Aglaia (?) *acuminata*, n. sp., *id.* p. 304.
Chlamydotheca subglobosa (Sowerby) described and figured by Brady, (18) p. 300; *australis*, n. sp., Brady, (17) p. 91.
Cypridæ, structure of male generative organs, and spermatogenesis in; Stuhlmann (204).
Cypris viridula, n. sp., Brady, (17) p. 88; *stanleyana* (King), *tatei*, n. sp., *mytiloides*, n. sp., *id.* p. 89.
Cypris malcomsoni (G. S. Brady) [= *C. cylindrica* (Baird), but not = recent *C. cylindrica* (Sowerby)] described and figured by Brady, (18) p. 297. *C. monilifera*, n. sp., *id.* p. 298. *C. lucata* and *purpurascens*, n. spp., *id.* p. 298. *C. halyi*, *tenuicauda*, and *furfuracea*, *id.* p. 299.
Cyprinotus, n. g., with sole sp. *cingalensis*; Brady, (18) p. 301.
Notodromas fuscatus, n. sp., Brady, (17) p. 92; *madarászi*, n. sp., Örley, (158) p. 100.
Candona lutea (King) and *tenuis*, n. sp., Brady, (17) p. 92.
Cypridopsis globosa and *marmorata*, n. spp., Brady, (18) p. 303; *minna* (King sp.), Brady, (17) p. 91; *funnebris*, n. sp., *id. ib.*

CYTHERIDÆ.

- Cytheridea orientalis* and *pusilla*, n. spp., Brady, (18) p. 311.
Loxoconcha sagittalis, n. sp., *alata* (G. S. Brady), *gibbera*, n. sp., *id.* p. 312; *avellana*, *papillosa*, and *elongata*, n. spp., *id.* p. 313; *cuneiformis*, n. sp. (auct. Brady), Malcomson, (136) p. 261; *reticulata*, p. 55; *rizzolensis*, p. 116, both n. spp., Seguenza (191).
Xestoleberis sulcata, n. sp., Brady, (18) p. 314; *saccata*, n. sp., Seguenza, (191) p. 157; *compressa*, *id.* p. 159, (193) p. 45.
Bythocythere retusa, n. sp., Brady, (18) p. 315; *pavo*, n. sp. (Brady), Malcomson, (136) p. 261; *reticulum*, n. sp., Seguenza, (191) p. 250.
Paradoxostoma cingalense, n. sp., Brady, (18) p. 315; *truncatum*, n. sp., Malcomson, (136) p. 262; *obtusatum*, n. sp., Seguenza, (192) p. 24; *crassum*, n. sp., *id.* p. 32.
Cythere truncatula and *fabacea*, n. spp., Brady, (18) p. 305; *ruperti*, n. sp., and *cancellata* (G. S. Brady), *id.* p. 306; *subcuneata* and *coralloides*,

n. spp., *id.* p. 307; *stimpsoni* (Brady) described and figured, *id.* p. 308. [*C. stimpsoni* from Mediterranean, so called by author, a distinct sp., and to be known as *C. normaniana*]. *C. bimamillata* and *laqueata*, n. spp., *id.* p. 309; *rectangularis*, *hodgii*, *iniqua*, of author, described and figured, *id.* p. 310; *jonesii* (Baird), Kaufmann, (110) pp. 146-191; *antiqua* (Baird), *id.* p. 191; *quadridentata* (Baird), *id.* p. 195.

Sclerochilus contortus [?], (Sars), Brady, (18) p. 199.

Eucythere spinescens, n. sp., Seguenza, (191) p. 33.

Cytherura consanguinea, n. sp., Seguenza, (191) p. 160; *microptera*, n. sp., *id.* p. 161; *biproducta*, n. sp.; *id.* (191) p. 205, (193) p. 77; *exagonalis*, n. sp., *id.* (193) p. 47; *calcarata*, n. sp., *id.* (193) p. 76; *speciosa*, n. sp., *id.* (193) p. 78; *ornata*, n. sp., *id.* (193) p. 110.

Cytheropteron simplicie, n. sp., *id.* (191) p. 207; *oblongum*, n. sp., *id.* *ibid.* p. 208; *rhomboideum*, n. sp., *id.* *ibid.* p. 215.

Cytherideis gracillima, n. sp., *id.* *ibid.* p. 296; *elegans*, n. sp., *id.* *ibid.* p. 297; *mucronata*, n. sp., *id.* (192) p. 22.

Sclerochilus insignis, n. sp., *id.* (192) p. 23.

CYTHERELLIDÆ.

Cytherella sicula, Seguenza, (192) p. 124; *cuneata*, p. 126; *rizzolensis*, p. 149; *papilloso-lineata*, p. 150; *luciae*, p. 166; *micrometrica*, p. 238; all n. spp.; *calabra*, *id.* (194) p. 59; *areolata*, p. 60, n. spp.

PALÆONTOLOGY.

Primitia, eight n. spp. of, Jones, (107) pp. 403-413.

Phreatura, n. g., with one sp. *concinna*, Jones, (104) p. 507.

Youngia, n. g., with one sp. *rectidorsalis*, *id.* *ibid.*; for figs. of this and the preceding genus, *vide* Jones, (105).

Placentula, n. g., Jones, (107) p. 407, with sole sp. *excavata*.

Kirkbya variabilis, n. sp., Jones, (102).

Metacypris bradyi and *whitei*, n. spp., Jones, (100) p. 146.

Cytherideis marshii, n. sp., *id.* p. 147.

Cythere reticulata, *gracilis*, *cuneata*, *nodifera*, n. spp., Kafka, (108) pp. 53 & 54.

Cytheridea (?) *atlantosaurica*, n. sp., *id.* p. 147.

Beyrichiopsis, n. g., Jones, (103) p. 434; to include *fimbriata*, n. sp., p. 434; *fortis*, n. sp., p. 435; *cornuta*, n. sp., p. 436; *crinita* (J. & K.), p. 436; *subdentata*, *simplex*, n. spp., p. 437; *vide* also Jones, 104.

Beyrichiella, n. g., *id.* p. 438; *B. cristata*, n. sp., *id.* p. 438.

Beyrichia, revision of the genus, Jones, (106); *bradyana*, n. sp., Jones, (103), p. 438; *cratigera* (G. S. Brady, MSS.), *id.* p. 439; *concinna*, n. sp., Jones, (106) p. 356; *admixta*, n. sp., *id.* p. 359; *lacunata*, n. sp., *id.* *ibid.*; *noettingi*, n. sp., Reuter, (176) p. 637; *bronni*, n. sp., *id.* p. 638; *baueri*, n. sp., p. 640; *bolliana*, n. sp., *id.* p. 645; *dubia*, n. sp., *id.* p. 648.

Bollia, n. g., Jones, (106), p. 360; with n. spp. *bicollina* and *uniflexa*, p. 361; *vinei*, n. sp., Jones, (107) p. 406.

Kloedenia, n. g. (olim *Beyrichia*) and sp. *intermedia*, *id.* (106) p. 362.

Strepula, n. g., Jones, (107) p. 403, with n. spp. *concentrica* and *irregularis*, p. 404; *beyrichioides*, p. 405.

Hipponicharion, n. g., eos, n. sp., Matthew, (139) p. 64.

Beyrichona, n. g., with n. spp. *papilio*, p. 65; *tinea*, p. 66, *id. ibid.*

COPEPODA.

Vide Brady in 'Challenger,' (29) p. 843.

For *Gastroecus*, n. g., *Choniostoma*, n. g., *Choniostomatidæ*, n. fam., *vide* Hansen (85).

ARGULIDÆ.

Argulus, the "poison apparatus" a sensory structure, Leydig (125).

BOMOLOCHIDÆ.

Eucanthus marchesettii, n. sp., Valle, (212) p. 244.

CALANIDÆ.

Diaptomus orientalis, n. sp., Brady, (18) p. 296; *D. zachariae*, n. sp., Zacharias, (223); *salinus*, n. sp., Daday, (42) p. 305, (43) p. 17.

Centropages grimaldii, n. sp., Guerne, (81) p. 276.

Calanus finmarchicus (Müll.) as food of *Balanoptera borealis*; Collett, (38) p. 261.

CORYCÆIDÆ.

Lichomolgus (Sabelliphilus) spinosus, n. sp., Raffaele (172). *Vide* also Aurivillius (2).

CYCLOPIDÆ.

Cyclops pentagonus, n. sp., Vosseler, (216) p. 191; *bodamicus*, n. sp., *id.* p. 193; *pectinatus*, n. sp., Daday, (42) p. 223; *horváthii*, n. sp., *id.* p. 242; *frivaldszkyi*, n. sp., *id.* p. 248; *brevisetosus*, n. sp., *id.* p. 255; *tenuicaudis*, n. sp., *id.* p. 258. For the last five spp. *vide* also Daday, (43) pp. 5-12.

HARPACTIDÆ.

Attheyella cingalensis, n. sp., Brady, (18) p. 296.

Canthocamptus brevicornis, n. sp., Daday, (42) p. 277, (43) p. 14.

Balanophilus unisetus (Aurivillius) previously only taken on *Balanoptera sibbaldi*, now on *B. borealis*; Collett, (38) p. 256.

CUMACEA.

Vide Sars in 'Challenger,' (29) p. 742.

CAMPYLASPIDÆ.

Campylaspis pacifica, sp. n., Sars, (184) p. 66 ; *nodulosa*, n. sp., p. 68.

CUMELLIDÆ.

Nannastacus suhmii, n. sp., Sars, (184) p. 63.

CUMIDÆ.

Cyclaspis australis, n. sp., Sars, (184) p. 12 ; *pusilla*, n. sp., *id.* p. 19 ; *exsculpta*, n. sp., *id.* p. 20.

DIASTYLIDÆ.

Diastylis stygia (Sars), Sars, (184), p. 44 ; *horrida*, n. sp., p. 55 ; *erinaceus*, n. sp., p. 58 ; *mystacina*, n. sp., p. 60.

LAMPROPIDÆ.

Paralamprops, n. g., Sars, (184), p. 26 ; *serrato-costata*, n. sp., *id.* p. 26.

LEUCONIDÆ.

Leucon assimilis, n. sp., Sars, (184) p. 34 ; *tenuirostris*, n. sp., *id.* p. 38.

Eudorella abyssi, n. sp., *id.* p. 41.

VAUNTHOMPSONIDÆ.

Vaunthompsonia meridionalis, n. sp., Sars, (184) p. 23.

CIRRHIPEDIA.

Vide Hoek in 'Challenger,' (29) pp. 851-856.
Spermatogenesis, Gilson (78).

RECENT.

Balanus campbelli, n. sp., Filhol, (59) p. 487.

FOSSIL.

Scalpellum kamajkense, Kafka, (109) pp. 563 & 576 ; *crassum*, *nitens*, pp. 566 & 576, all nn. spp. ; *nettelbladi*, n. sp., Noetling, (148) p. 82.

Pollicipes costatus, Kafka, (109) pp. 570 & 577 ; *cuspidatus*, pp. 571 & 577 ; *kosticensis*, pp. 572 & 577 : all nn. spp.

Balanula cretacea, n. sp., *id.* pp. 575 & 577.

Lepas aquitanica, n. sp., and *L. orbignyi* (Des Moulins, MSS.), Fischer, (60) pp. 190 & 191.

RHIZOCEPHALA.

Sacculina fraissei, n. sp., Giard, (74) p. 84; embryogeny of *S. carcini*, Delage (48). [Vide also Delage (50) (51), Giard (76).]

Peltoaster, nervous and other systems of, compared with those of *Sacculina*; Delage (52).

GIGANTOSTRACA.

Podostomata, new term to supplant *Gigantostraca*; Packard (159).

RECENT.

Limulus in the Pacific, San Francisco (128).

PALÆONTOLOGY.

Illænus. Holm (93) gives a full account of the genus, and describes the following new forms: *I. jevensis*, p. 57; *intermedius*, p. 69; *ariensis*, p. 80; *sulcifrons*, p. 82; *plantini*, p. 85; *revaliensis* (olim *I. wahlenbergi*, Eichw.), p. 87; *oculosus*, p. 98; *chudleighensis*, p. 101; *sinuatus* (also taken from *I. wahlenbergi*), p. 102; *ladogensis*, p. 113; *angustifrons* = *crassicauda* (Römer), p. 130; *masckeii*, p. 139; *proles*, p. 154; *livonicus*, p. 157; *cæcus*, p. 162.

Eurymetopus, n. g., Postlethwaite (170), with n. spp. *cumbrianus*, p. 460, and *harrisoni*, p. 461.

Barrandeia falcata, n. sp., *id.* p. 462.

Agnostus, n. spp. of: *regulus*, p. 67; *partitus*, p. 68; *vir*, p. 69; *tessella*, p. 71; *umbo*, p. 71; *obtusilobus* and *acutilobus*, p. 73: Matthew (140).

Paradoxides abenacus, n. sp., *id.* p. 78.

Dindymene haidingeri, from Co. Clare; Baily, (4) p. 373.

Anomocare pawlowskii, n. sp., Schmidt, (187) p. 501.

Liostracus ? *maydeli*, n. sp., *id.* p. 503.

Agnostus czekanowskii, n. sp., *id.* p. 504.

Phacops (*Monorakos*) *lopatini*, n. sp., *id.* p. 506; *P. (M.) sibericus*, *id.* p. 507; *P. obtusa*, n. sp., Lindström, (129) p. 41.

Proetus (*Phæton*) *slatkowskii*, n. sp., Schmidt, (187) p. 508.

Cyphaspis sibirica, n. sp., *id.* p. 510; *punctiliosa*, Lindström, (129) p. 77.

Eurypterus ? *czekanowskii* and *punctatus*, n. spp., Schmidt, (187) p. 511.

Chirurus gotlandicus, n. sp., Lindström, (129) p. 45.

Sphærexochus laciniatus, n. sp., *id.* p. 47; *beyrichi*, n. sp., *id.* p. 48.

Youngia, n. g., with n. spp. *globiceps* and *inermis*, *id.* p. 50.

Olenus nuneatonensis, n. sp., Sharman, (195), p. 565.

Obolella granulata, n. sp., *id.* p. 566.

Lichas pulifer, n. sp., Lindström, (129) p. 57; *araneus*, *marginatus*, *visbyensis*, n. spp., *id.* p. 58; *plicatus*, *triquetrus*, n. spp., *id.* p. 59.

Harpes acuminatus, n. sp., *id.* p. 62.

Culymene laevis, n. sp., Lindström, (129) p. 68; *frontosa*, p. 69; *intermedia*, p. 71; *excavata*, p. 72; *palpillata*, p. 73: all n. spp.

Phaetonidus rugulosus, n. sp., *id.* p. 75; *longifrons*, n. sp., *id.* p. 76.

Proetus obconicus, *id.* p. 78; *distans*, *acutus*, p. 79; *signatus*, p. 80; *granulatus*, *verrucosus*, p. 81: all n. spp.

Bumastus holmi, n. sp., *id.* p. 83; *sulcatus*, n. sp., *id.* p. 84.

Bronteus irradians, n. sp., *id.* p. 88; *umbonatus*, *crebristriatus*, p. 89.

Arthropleura armata (Jord.), Kliver (115).

Homalonotus bonnissenti, n. sp., Morière, (144) p. 75.

Phillipsinella, n. g., with sole sp. *P.* (= *Phillipsia*) *parabola*; Novák, (153) p. 584.

Microdiscus parkeri, n. sp., Walcott, (217) p. 157.

Olenellus, relation to other genera, *id.* p. 164; *gilberti*, development of, *id.* p. 173.

Olenoides typicalis, n. sp., *id.* p. 183; *levis*, n. sp., *id.* p. 187.

Ptychoparia housensis and *piochensis*, n. spp., *id.* p. 201.

Crepicephalus liliana, n. sp., Walcott, (217) p. 207; *augusta*, n. sp., *id.* p. 208.

Oryctocephalus, n. g., with sole n. sp. *primus*; *id.* p. 210.

Protypus, n. g., with sole sp. *P.* (= *Angelina*) *hitchcocki* (Whitfield), *id.* p. 211.

Bathyriscus howelli, n. sp., *id.* p. 216.

ARACHNIDA.

BY

R. INNES POCKOCK.

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EMBRYOLOGY.

LOCY (63) describes the development of *Agelena navia*. At one end of the ventral surface of the embryo appears a thickening, the primitive cumulus; at the opposite extremity is the caudal thickening, and between these the ventral plate, which is soon marked by furrows into protozonites. Six of these are distinguishable, and from their lateral portions the appendages bud forth. The two first zonites are formed from the cephalic plate. The mesosomatic region bears provisional appendages; the two posterior pairs of which form the spinning mammillæ. At the base of the chelicerae, the poison-glands are formed from certain spongy cells, probably by invagination. The lung-sacs arise as a pair of invaginations. The caudal-plate gives rise to six metasomatic segments. The nerve-ganglia arise at the base of the appendages from thickened ectoderm. The stomodæum gives rise to the pharynx, œsophagus, and stomach; from the proctodæum are formed the stercoral pocket and the malpighian tubes. The development of the eyes is minutely described.

KOWALEWSKY (57) describes, in detail, the formation of the germinal layers and the development of the alimentary, nervous, vascular, and genital systems of *Androctonus ornatus*.

BRUCE (14), treating of the embryology of Spiders, describes the conversion of two pairs of abdominal appendages into the lung-books by a process of involution: prior to the involution, the epithelium of the appendages assumes the characters of the epithelium of the lung-books. There is a fold in the blastoderm surrounding the cephalic region of the Spider-embryo, which corresponds to the amnion of Insects.

HENKING (37) describes elaborately the structure of the ovum in the *Phalangidea*.

CARRIÈRE (21) describes the development of various kinds of eyes. In some Scorpions ocelli are present in a rudimentary condition. In *Chelifer*, the eyes are devoid of pigment; each consists of a chitinous lens, beneath which are two layers of cells, one lenticular and one retinal; there are no rods. The irregularity of the appearance of these organs in various genera of the *Cheliferidae*, shows that they are organs that are disappearing. The same author, making reference to the observations of M. Locy, on the development of the eyes in *Agelena navia*, thinks that there is no constriction of the invaginated pouch, as described by that author.

ANATOMY.

GRASSI (32) gives a description of the anatomy and histology of *Koenenia mirabilis*, a form intermediate between the *Gigantostraca* and

the *Arthrogastra*. The branchiæ have been lost, but no special organs of respiration have yet been acquired.

WINKLER (97) treats of the heart in various groups of *Arachnida*. This organ was observed in numerous *Gamasidae*. It is a short, broad organ, situated in the anterior portion of the abdomen; on the upper surface are two valvular openings; the aorta opens freely into the body-cavity above the cerebral ganglion; behind and in front the heart is connected with the dorsal surface by fibres. A similar organ was noticed in nymphs and young females of *Ixodes ricinus*. In the *Phalangida*, the heart lies in the anterior abdominal region, and is provided with two pairs of lateral clefts. In *Chernetidae*, the heart has not been previously observed. In young forms of *Obisium silvaticum* it was seen to be situated in the three first abdominal somites, and to be provided posteriorly with a pair of clefts. As in the *Phalangida*, a valvular fold separates the heart from the aorta. The arterial system of Scorpions, HOUSSAY (39) maintains, consists of two groups of vessels—dorsal and ventral—which are connected with each other at the anterior end of the body; the connecting vessels envelope the nerve-cords which run from the cerebral to the thoracic mass. The resemblance between the arrangement in the Scorpion and in *Limulus* is pointed out.

SAINT-REMY (78) states that the brain in *Tegenaria domestica*, *Epeira diademata*, and *Phalangium opilio* is formed on the same plan as in Scorpion. There are two sets of nerve cells, those with a layer of protoplasm round the nucleus, and those without this layer; these latter exist only in the brain, and are especially abundant in the optic portions of it. In Scorpion the ganglion for the pectines resembles structurally the antennary ganglion, hence it seems probable that the former appendages are sense-organs. The *Araneina* and *Phalangida* possess nothing like this ganglion.

BRUCE (15) also describes the structure of the brain. It is divided into an anterior and posterior portion by an ingrowth of investing perineurium; the former innervates the rostrum, the lateral projecting portions of which resemble the antennæ of Insects; the latter supplies the labrum, which, as in Insects, is a paired structure. The mandibular ganglion is situated below this posterior portion.

For remarks upon the presence of a heart in *Gamasus*, see KRAMER (58) and MICHAEL (69).

BRUCE (15) describes a sense-organ in the coxal-joint of the fourth pair of legs in a young *Phrynus*. The same author points out the resemblances between this Arachnid and *Limulus*.

For the comparative anatomy of the *Arachnida*, see NUHN (72). BERTKAU (10) has studied the eyes of Spiders.

PHYSIOLOGY.

DAHL (26) has investigated the sensory powers of various Spiders. *Attus arenatus* was influenced by loud knocking; this species and *Xysticus lanio* could very imperfectly distinguish colours, but this faculty existed in *Epeira cornuta* and in *Drassus quadripunctatus*. A male *Epeira pata-*

giata could distinguish odours. The *Attidæ* were very sensitive to odours, the *Thomisidæ* but little so. By means of the sensory organs on the palps and limbs Spiders discover the presence and position of an insect in the web.

PLATEAU (75) states that in female *Arachnida* the palpi are apparently of but little importance, their removal hindering neither the seizure of prey nor the spinning of webs.

MICHAEL (68) states that the supra-anal papilla in the female *Glyciphagus* is the bursa copulatrix. MÉGNIN (66) comes to the same conclusion.

HALLER (33) has notes upon *Cytochilus sarcoptoides* and upon *Tetranychus molestissimus* of the Argentine Republic. A species allied to the latter appears to be the cause of the Port Natal *Sicht*, and possibly of the *Erythema autumnale* which obtains in the South of France.

MÉGNIN (66) accounts for the sudden appearance of myriads of Mites by the following fact: During starvation all the organs of a young *Glyciphagus* become transformed into a gelatinous mass, which collects in the cavity of the thorax and becomes surrounded by a chitinous envelope. In this condition, entirely at the mercy of the winds, the creature remains until brought into an environment favourable for development.

On the suicide of the Scorpion, see BAER (5); and for observations upon the effect of Scorpion stings upon human beings, see THOMPSON (93).

CLASSIFICATION.

SCHIMKEVITCH (79) compares the *Arachnida* with the *Insecta*. The antennæ of the latter are not represented in the former, but the post-oral appendages in the two groups correspond, pair for pair. With regard to the *Pycnogonida* and *Arachnida*, the four pairs of legs in each group are supposed to be homologous; the mandibles answer to the chelicerae, and the palps and oviferous legs together to the maxillæ. The larva of the *Acarina* is compared with that of the *Chilognatha*. The Crustacean character of *Limulus* is maintained.

OUDEMANS (73) looks upon the *Acaroidea* as a special group, which should be separated from the *Arachnoidea*. The *Tardigrada* are allied to the *Chetopoda* more nearly than to the *Arachnida*.

THORELL (91) criticises the classification of the *Aracnoidea* propounded by Dr. Bertkau. For a discussion concerning the claims of two naturalists for priority in formulating a particular classification of the *Arachnida*, see LANKESTER (59, 60), CLAUS (23, 24), and BERTKAU (9). For the anatomy and classification of the *Phytptidæ*, see NALEPA (71).

HABITS, MIMICRY, &c.

The *Attidæ*, BERTKAU (11) states, frequently resemble Ants; so also do the *Drassidæ*, and particularly the genera *Phrurolithus* and *Micaria*. Among the *Thomisidæ* and *Epeiridæ* this kind of mimicry is unknown; but the *Theridiidæ* furnish a beautiful example in *Formicina mutinensis*.

On elms infested by *Lasius* and *Formica*, a species of *Lasæola* occurs, the male of which alone resembles the Ants.

On the mimicry of *Thomisus decipiens*, see FORBES (29).

On the habits of *Theridium viparium*, see HENKING (38), of *Epeira diademata*, LENDL (61), of *Pachylomerus carabivorus*, ATKINSON (2, 3), and for a short work on the structure and habitats of some British Spiders, SKUSE (88).

On the dimorphism of Spiders, see CAVANNA (16).

PALEONTOLOGY.

BORRE (13) gives tables to show the geological distribution of the *Arachnida*, and HARVEY (35) records the first appearance of *Anthraco-martus trilobitus* in the coal-fields of N. America.

DISTRIBUTION.

Europe.

BECKER (6) records *Enyo gallica* (Simon) from Belgium. DAHL (25) gives list of the species of *Erigone* found in Schleswig-Holsteins, describing 12 new genera for the reception of previously known species.

VAN HASSELT (36) gives catalogue of the Spiders known to occur in Holland, and CANESTRINI (18, 19) characterises the genera and species of *Analgesini* and *Eupodini*, occurring in Italy.

KOELBEL (56) gives list of the *Arachnida* and *Pycnogonida* from Jan Mayen.

BECKER (7) describes a new species of *Hahnia* from Hungary.

Asia.

From Cambodia and Siam, SIMON (81) describes 2 new species of *Attidæ*, 2 of *Lycosidæ*, 3 of *Thomisidæ*, 2 of *Drassidæ*, 3 of *Epeiridæ*, 1 of *Uloboridæ*, *Theridiidæ*, *Sparassidæ*, and *Hersiliidæ*, 5 of *Theraphosidæ*, and of *Opiliones* 1 new genus and species. From Sumatra, the same author (80) describes 2 new genera of *Thomisidæ*, and from Japan 2 new species.

SIMON (86) describes 2 new species of *Agalenidæ* from Yokohama.

Africa.

LENZ (62), from Madagascar, describes 7 new species of *Epeiridæ*, 3 of *Lycosidæ*, 1 of *Attidæ*, *Ctenidæ*, *Sparassidæ*, *Theridiidæ*, and *Theraphosidæ*.

SIMON (80), from Madagascar, describes 8 species of *Thomisidæ*: from Zambesi, 1; Zanzibar, 1; and Sierra Leone, 1.

KARSCH (43) describes 3 new Scorpions from the Gaboon, 1 new species of *Gelotopæus* (46) from E. Africa, and a species of *Hemicleaa* (47) from S. Africa. From Massai-land, the same author (50) describes 1 new genus and 3 new species of *Solpugidea*, and 1 new genus and species of *Theraphosidæ*.

America (North and South).

KEYSERLING (51) describes about 150 new species of *Theridiidae*, and many new genera, from various parts of America.

SIMON (82), from Patagonia and Brazil, describes 2 new species of *Attidae*, 3 of *Lycosidae*, 7 of *Drassidae*, 3 of *Theraphosidae*, and 1 of *Phrygnidae*.

KARSCH (45) describes 1 new *Epeira* from Rio, and 1 new *Idiops* from Paraguay.

ATKINSON (3), from N. America, describes 2 new genera and 6 new species of *Theraphosidae*.

OSBORN & UNDERWOOD (74) give a preliminary list of the *Acarina* of N. America.

SIMON (80) describes 4 species of *Thomisidae* from Brazil, and 3 from Uruguay.

BECKER (7), 1 new *Pardosa* from Mexico.

SIMON (86) characterizes 8 new species of *Agalenidae* from N. America.

Australia.

KOCH (53) describes 3 new genera and 30 new species of *Epeiridae* from the Australian Region, and SORESENSEN (89) characterizes 4 new families, 8 new genera, and 17 new species of *Phalangidea* from the same Region.

SIMON (86) describes 2 new genera and 2 new species of *Agalenidae* from Tasmania.

NEW GENERA AND SPECIES. SYNONYMY.

SCORPONIDEA.

Butheolus (Simon) syn. *Orthodactylus* (Karsch), Karsch, (43) p. 75.

Rhoptrurus, for *Odonturus*, nom. preocc., *id. t. c.* p. 76.

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Myrmekiaphila, n. g., *foliata*, p. 132, from N. America, *id. t. c.*

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Eripus heterogaster, from Brazil, Göldi, (31) p. 411.

Dinopis albo-marginatus, from Madagascar, Lenz, (62) p. 405.

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Budessa, n. g., p. 76, *ampycoides*, p. 77.

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Pronematus, n. g., *bonatii*, p. 721, from Trentino, *id. t. c.*

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MYRIOPODA

BY

R. INNES POCKOCK.

LIST OF PUBLICATIONS.

1. BERLESE, A. Julidi del Museo di Firenze. Contributo alla Fauna Miriapodologica Italiana. Bull. Soc. Ent. Ital. xviii, pp. 42-96 & 183-238.

After preliminary remarks upon the structure and classification of the *Julidae*, the author gives exhaustive descriptions of the genera and species known to occur in Italy. 1 new genus and 9 new species are characterised.

2. BERGHI, R. S. Die weitere Entwicklung der westindischen *Peripatus*-Arten. Kosmos, xviii, pp. 454-462.
3. BORRE, A. PR. DE. Analyse de deux travaux récents de MM. Scudder et Brongniart sur les Arachnides fossiles. CR. Ent. Belg. 1886, p. cxxxi.

In addition to remarks upon the *Arachnida*, the paper treats of fossil *Myriopoda*, a table to show the distribution of the group in time being given.

4. ——. Note sur les Myriapodes et Arachnides fossiles. T. c. p. xvii.
5. BOURNE, G. C. Stridulation and Sense-organs in Diplopod Myriapods. Am. Nat. xx, p. 731.
6. CHALANDE, J. Recherches sur le mécanisme de la respiration chez les Myriopodes. Bull. Soc. Toulouse, 1886; abstr., J. R. Micr. Soc. lviii, p. 385, & C.R. civ, p. 126.
7. GABBI, V. Contribuzione allo studio dei nervi motori e della loro terminazione nei muscoli striati degli *Artropodi*. Bull. Soc. Ent. Ital. xviii, p. 324.
8. GÖLDI, E. A. Biologischen miscellen aus Brasiliens. iv. Eigentümliche, unterirdische Bauten einer brasilianischen *Polydesmus*-Art. Zool. JB. l, p. 730.
9. GRASSI, B. I progenitori dei Myriapodi e degli Insetti. Mem. iv Cenni Anatomici sul genere *Nicoletia*. Bull. Ent. Ital. xviii, p. 173.

10. [GRASSI, B.] I progenitori degli Insetti e dei Miriapodi. Morfologia della Scolopendrella. Atti Acc. Tor. xxxvii, p. 593.
11. HAACKE, W. Beobachtungen über Lebensweise und Gliedmassenbau der Schildassel, *Scutigera Smithii* (Newp.) Zool. Gart. xxvii, No. 11, pp. 335-340.
12. HAASE, E. Schlesiens Diplopoden. I. Z. Ent. Bresl. xi, pp. 7-64.
The author characterizes the order, sub-orders, families, genera, and species, gives lists of synonyms, and describes one species as new.
13. —. Ueber Verwandtschaftsbeziehungen der Myriapoden. Tag. Deut. Nat. Vers. 59, p. 303.
14. —. Die Vorfahren der Insecten. SB. Abh. Isis in Dresden, 1886, pp. 85-91; abstr. J. R. Micr. Soc. lviii, p. 384.
15. HEATHCOTE, F. G. Early development of *Julus terrestris*. P. R. Soc. xl, pp. 73-76; Am. Nat. xx, pp. 662-666.
16. HORST, R. On a specimen of *Peripatus*, Guild, from Sumatra. Notes Leyd. Mus. viii (1) pp. 37-41.
17. KARSCH, F. Einige fernere Ergänzungen zur "Litteratur für die gesammte Myriopodenkunde" in Robert Latzel's werk "Die Myriopoden der österreichischungarischen Monarchie." 2 Hälfte. Wien: 1884. Berlin: Ent. Zeits. xxx, p. 80.
18. —. Verzeichniss der von Dr. G. A. Fischer während der in Aufträgen der geographischen Gesellschaft in Hamburg unternommenen Reise in das Massai-land gesammelten Myriopen und Arachniden. JB. Hamb. 1886, pp. 131-139.
1 new species.
19. KERVILLE, H. GADEAU DE. Les Myriopodes de la Normandie (2nd liste), suivi de: Diagnoses d'Espèces et de Variétés nouvelles (de France, Algérie, et Tunisie) par R. Latzel. Bull. Soc. Rouen, 1886, pp. 165-177.
20. LATZEL, R. Diagnosi di specie et varietà nuove di Miriapodi raccolte in Liguria da G. Caneva. Bull. Ent. Ital. xviii, p. 308.
4 species mentioned, one of them new.
21. LUCAS, M. H. Sur les mœurs des Chilopodes. Bull. Soc. Ent. Fr. vi, pp. xciii-xcv.
Records the fact that *Heterostoma newporti* (Lucas), is oviparous.
22. MACÉ, M. Sur la phosphorescence des Géophiles. C.R. ciii, No. 25, pp. 1273 & 1274; abstr. in J. R. Micr. Soc. lvii, p. 230.
23. MAINDRON, MAUR. Sur les mœurs des Myriapodes. Bull. Soc. Ent. Fr. vi, p. xcv.
24. MEINERT, FR. Myriapoda Musei Cantabrigiensis. Part I. *Chilopoda*. P. Am. Phil. Soc. xxiii, pp. 161-233.

After discussing the anatomical nomenclature of the group generally, the author proceeds with the consideration of the specimens, character-

ising the various divisions and subdivisions; giving lists of synonyms and descriptions of the genera and species, whether new or old.

25. [MEINERT, Fr.] Myriapoda Musei Hauniensis. Part III. *Chilopoda*. Vid. Medd. for 1884-86, pp. 100-150.

26. OUDEMANS, A. C. Die gegenseitige Verwandtschaft, Abstammung und Classification der sogenannten Arthropoden. Tijdschr. Nederl. Dierk. Ver. i, 1886, pp. 37-56; abstr. J. R. Micr. Soc. vi, p. 589.

The author discusses the affinities between the *Hexapoda* and *Myriapoda*.

27. PACKARD, A. S. Larval form of *Polydesmus*. Am. Nat. xx, (7) p. 651.

Comparison between *P. complanatus* and *canadensis*.

28. PLATEAU, F. Recherches sur la perception de la lumière par les Myriapodes aveugles. J. de l'Anat. Phys. xxii, pp. 431-457.

29. —. Expériences sur le rôle des palpes chez les Arthropodes maxillés. Palpes des Myriapodes et des Aranéides. Bull. Soc. Z. Fr. 1886, pp. 512-530.

30. QUELCH, J. J. *Peripatus* in Demerara. Nature, xxxiv, p. 288.

31. RATH, OTTO VON. Beiträge zur Kenntniss der Chilognathen. Die Sinnesorgane der Antenne und der Unterlippe der Chilognathen. Arch. mikr. Anat. xxvii, pp. 419-437.

32. SAINT-REMY, M. G. Recherches sur la structure du cerveau des Myriapodes. C.R. ciii, pp. 288-290.

33. SCHIMKIEWITCH, W. Les Arachnides et leurs affinités. Arch. Slav. Biol. i, pp. 309-319.

34. SCUDDER, S. H. Note on the supposed Myriopodan Genus *Trichilus*. Mem. Bost. Soc. iii, No. 13, p. 438.

35. SEDGWICK, A. Development of the Cape Species of *Peripatus*. Q. J. Micr. Soc. xxvi, pp. 175-212.

EMBRYOLOGY.

HEATHCOTE (15) calls attention to the connection of cell layers by means of cell processes in *Julus terrestris*. The nerve-cords are at first widely separated. The lumen of the malpighian tubes is continuous with that of the proctodæum.

SEDGWICK (35), in his paper upon the development of *Peripatus*, gives a full account of the nucleus of the unsegmented ovum; the male and female pronuclei, the structure of the gastrula, and the formation of the mesoderm are described, and the results which proceed from the discovery of the syncytial nature of embryo *Peripatus* are discussed.

ANATOMY.

SAINT-REMY (32) describes the structure of the brain in *Scolopendra*. It has the appearance of two pear-shaped lobes. These at the base are

in contact, terminally they give off the optic nerves. Below they are continued into a mass from which anteriorly spring the antennary nerves, posteriorly the oesophageal commissures, and medianly the unpaired visceral nerve.

VON-RATH (31) describes minutely the histology and nerve supply of the sense-organs in the antennæ and in the gnathochilarium of the *Diplopoda*.

PHYSIOLOGY.

PLATEAU (29) concludes that the function of the palpi in the *Myriopoda Chilopoda* is to clean the antennæ and legs, and to maintain food in the mouth in a position most suitable for its mastication by the mandibles. The same author (28), after a number of experiments, has decided that blind Chilopods can distinguish between light and darkness; that, whether blind or not, it is some time before a change from darkness to light is perceived; that the duration of this time is not greater in blind than it is in Myriopods provided with eyes; that the rapidity with which *Myriopoda* seek concealment is not only due to a wish to avoid the light, but is prompted by a desire to bring the whole surface of the body in contact with a damp medium.

The phosphorescence of *Geophilus* is apparently due to a colourless liquid which is excreted from the whole of the ventral surface of the body; MACÉ (22).

CHALANDE (6) has experimented upon the mechanism of respiration. During repose inspiration and expiration are due to movements in the respiratory apparatus caused by the contraction of the dorsal vessel, and that during activity similar effects are produced by the action of the muscles of the body and by the movements of the alimentary canal. According to HAASE (13), the lip-glands of some Myriopods are of use in attachment to smooth surfaces.

CLASSIFICATION.

HAASE (14) thinks that *Scolopendrella* stands nearest to the primitive Insect. It is distinguished by multiarticulated antennæ, three pairs of jaws, twelve pairs of legs, and a pair of long caudal appendages in which is placed a spinning gland. The abdominal processes are homologous with the appendages of the two last pairs of legs in *Machilis*. Attaching great importance to these abdominal processes, the author (13) seeks to derive from a type resembling *Scolopendrella* the *Myriopoda* and *Insecta*.

GRASSI (10) gives a detailed account of the anatomical relations of the same genus. Its affinities with the *Pauropoda*, *Chilopoda*, and *Diplopoda* are discussed, and its resemblances with *Machilis* and *Compodea* described. SCHIMKIEWITCH (33) regards *Pauropus* as an ancestral type, and compares the larva of the *Chilognatha* with that of the *Acarina*. OUDEMANS (26) thinks that the evidence of anatomy is in favour of the view that the *Myriopoda* and *Hexapoda* form a natural group. BERLESE (1) gives his views of the classification of the *Chilognatha*.

DISTRIBUTION.

Europe.

MEINERT (25) describes a new species of *Scutigera*, from Spain, and a new *Geophilus*, from Austria. BERLESE (1) describes 9 new species and 1 new genus of *Julidæ* from Italy, and LATZEL (20) a new species of *Strongylosoma* from the same country. From Silesia, HAASE (12) describes a new species of *Craspedosoma*.

Asia.

MEINERT (24) describes from India 1 *Scutigera* and 1 *Scolopendra*; from Serampore, 1 *Scolopendra*; from Hong Kong, 1 *Scolopendra* and 1 *Scutigera*; from Madras, 1 *Heterostoma*; from Kooloo, 2 species of *Himantarium*, 1 of *Scutigera*, and 1 new genus allied to *Scolopendra*; from Nangasaki, 1 new *Mecistocephalus*. HORST (16) reports the occurrence of *Peripatus* in Sumatra.

Africa.

MEINERT (24) describes from Zanzibar 1 new *Cormocephalus* and 1 new *Cryptops*; from Egypt, (25), 2 new species of *Himantarium*. KARSCH (18), from Masai-land, describes a new species of *Orydesmus*.

Australasia.

MEINERT (25), from Queensland, describes 1 *Branchiostoma*; from Brisbane, 1 *Cormocephalus*; from the Sandwich Islands, (24), 1 *Opisthemea*.

N. America.

MEINERT (24, 25), from N. America, describes new species of *Lithobius* 5, of *Scolopocryptops* 1, of *Opisthemea* 1, of *Cryptops* 1, of *Mecistocephalus* 2, of *Geophilus* 6, of *Scolioplanes* 2, of *Scutigera* 1.

S. and Central America.

MEINERT (24, 25), from Panama, describes 1 new *Scutigera*; from W. Indies 1 new *Scutigera*; from Hayti 1 *Otostigma* and 1 *Cupipes*; from Brazil 1 *Otostigma* and 2 *Scolopendra*; from Monte Video 1 *Cryptops* and 1 *Otostigma*; from Mexico 1 *Scolopendra*, and from Patagonia 1 *Cryptops*.

NEW GENERA AND SPECIES.

CHILOPODA.

SCUTIGERIDÆ.

Scutigera castanea, from Kooloo, p. 171, *nigro-vittata*, from Panama, p. 173, *microstoma*, from India, p. 173, Meinert (24); *sinensis*, from Hong-

Kong, p. 102, *superba*, from W. Indies, p. 104, *hispanica*, from Spain, p. 105, *occidentalis*, from Granada and Nicaragua, p. 105, *sanguinea*, from Buenos Ayres, p. 106, *id.* (25).

LITHOBIDÆ.

Lithobius latzelii, from Virginia, p. 175, *cantabrigiensis*, from Mass., U.S., p. 177, *jowensis*, p. 177, Meinert (24), *exiguus*, from New York, p. 110, *lundii*, from New York, p. 111, *id.* (25).

SCOLOPENDRIDÆ.

Scolopocryptops georgicus, from Georgia, p. 180, Meinert (24).

Heterostoma triste, from Madras, p. 114, *id.* (25).

Branchiostoma subinermis, from Queensland, p. 117, *id. t. c.*

Olostigma occidentale, from Hayti, p. 185, *id.* (24), *limbatum*, from Brazil, p. 120, *sulcatum*, from Monte Video, p. 121, *deserti*, from Biskra, p. 121, *id.* (25).

Cupipes ungulatus, from Hayti and Pernambuco, p. 187, *quadrisulcatus*, from Ascension Island, South Seas, p. 187, *id.* (24).

Rhoda, n. g., *thayeri*, from Santarem, p. 188, *id. t. c.*

Asanada, n. g., *brevicornis*, from Kooloo, p. 189, *id. t. c.*

Scolopendra occidentalis, from Mexico, p. 197, *woodii*, for *inaequidens* (Wood), p. 198, *longispina*, from Brazil, p. 199, *rugosa*, from Hong-Kong, p. 202, *indica*, from India, p. 204, *id. t. c.*, *latro*, from Serampore, p. 127, *id.* (25).

Cormocephalus afer, from Zanzibar, p. 205, *id.* (24), *exiguus*, from Brisbane, p. 132, *id.* (25).

Opisthemega crassipes, from N. America, p. 209, *iusulare*, from Sandwich Islands, p. 209, *id.* (24).

Cryptops validus, from Zanzibar, p. 210, *patagonicus*, from Patagonia, p. 211, *sulcatus*, from Kentucky, p. 211, *id. t. c.*, *biscarensis*, from Biskra, p. 137, *fur*, from Riacho del Oro, p. 139, *galathea*, from Monte Video, p. 140, *id.* (25).

GEOPHILIDÆ.

Mecistocephalus heros, from N. Pike, p. 214, *breviceps*, from Nantucket, p. 214, Meinert (24); *japonicus*, from Nangasaki, p. 142, *id.* (25).

Geophilus mordax, from N. America, p. 217, *marginalis*, from Key West (N. America), p. 218, *urbicus*, from Mass., N. America, p. 218, *georgianus*, from Georgia, p. 219, *occidentalis*, from San Francisco, p. 220, *huronius*, from Mass., N. America, p. 220, *id.* (24); *austriacus*, from Austria, p. 144, *elegantulus*, from Riacho del Oro, p. 145, *tenebrosus*, from Riacho del Oro, p. 146, *id.* (25).

Scolioplanes robustus, from N. America, p. 224, *exul*, p. 224, *id.* (24).

Himantarium insigne, from Kooloo, p. 227, *indicum*, from Kooloo, p. 228, *id.* (24); *caldarium*, p. 148, *teniatum*, from Egypt, p. 149, *id.* (25).

DIPLOPODA.

JULIDÆ.

Julus (*Archiulus*) *brandti*, p. 90, *aurozonatus*, p. 92, *cavannæ*, p. 95, (*Ophyiulus*) *cæculus*, p. 200, (*Diploiulus*) *deportatus*, p. 208, *decipiens*, p. 209, (*Brachiulus* *lysiopetalinus*, p. 222, (*Typhloiulus*) *tobias*, p. 224, from various parts of Italy, Berlese (1).

Mesoiulus, n. g., *paradoxus*, p. 227, from Italy, *id. t. c.*

POLYDESMIDÆ.

Strongylosoma italicum, from Italy, Latzel, (20) p. 308.

Polydesmus (*Oxydesmus*) *fischeri*, from Massai-land, Karsch, (18) p. 133.

CHORDEUMIDÆ.

Craspedosoma (*Scotherpes*) *mamillatum*, from Silesia, Haase, (12) p. 60.

ARCHYPOLYPODA.

The genus *Trichiulus* is a portion of a fossil fern ; Scudder (34).

INSECTA.

BY D. SHARP.

ALTHOUGH the results of much investigation have been published in 1886, as is indicated by the large number of titles, yet no work of much extent or importance on systematic entomology has appeared during the year, Selys's revision (652) of part of one of the tribes of dragon-flies being the chief. A great deal of attention has been given to the development of the egg in the ovary, and an important paper has been published by Korschelt (369) on this subject, which has also been elucidated by Stuhlmann (690), Blochmann (58), Will (740), and others.

A very extensive memoir on the interesting but still very obscure subject of the luminosity of *Pyrophorus*, the firefly of America, has been given us by Dubois (154), and Hoinemann has also paid much attention (281) to this subject.

Perhaps the most remarkable work of the year is the third series of Fabre's "Souvenirs Entomologiques" (173). This contains the results of a large number of minute but long-continued observations and ingenious experiments on the habits and instincts of Insects. It is written with great literary skill, and, though from certain points of view imperfect, will be read with pleasure by all entomologists and by some with keen delight.

Forel's (209) memoir, besides giving original observations of much importance on the senses and intelligence of Insects, may be accepted as a good summing-up of recent views on this subject; and Wasman has published (722) some observations on the very curious relations between ants and the beetles that inhabit their nests.

Poulton's (560, 561) and Sasaki's (630) memoirs contain matter of considerable biological interest; and W. Muller's study of the caterpillars of the *Nymphalidæ* (475) is a great addition to entomological knowledge.

Redtenbacher's (581) paper on the wings of Insects is the most comprehensive one that has yet appeared on that apparently simple, but really very difficult subject; and Scudder's review of Palæo-entomology (647) is a great boon to readers of English.

In faunistic work much progress has been made with some of the volumes of Godman & Salvin's "Biologia Centrali-Americana" (247), and Distant (142) has completed his work on the Malay butterflies.

Karsch gives summary of, and some remarks on Brauer's new classification [*cf.* Zool. Rec. xxii, *Ins.* (42)], Ent. Nachr. xii, pp. 97-104.

Perhaps I may be allowed to again call the attention of entomologists who publish synonymy, to the advantage it would be if they would indicate what is now by appending some sign of the fact, such as "n. syn."

I.—TITLES.

1. AARON, F. S. On some New *Psocidae*. P. Ac. Philad. 1886, pp. 13-18, pl. i. [*Neuroptera*.]
1 new gen. and 7 new species.
2. AITKEN, E. H. A list of the Bombay Butterflies in the Society's collection, with notes. J. Bomb. Soc. i, pp. 126-135 & 215-218. [*Lepidoptera*.]
The notes are of a miscellaneous character; some of general as well as local interest.
3. ALBERS, G. Ein neuer *Lucanide*, von Peking. Deutsche E. Z. xxx, p. 27. [*Coleoptera*.]
4. ALLUAUD, C. Relation d'un voyage entomologique dans le territoire d'Assinie, possession Française de la côte occidentale d'Afrique. Ann. Soc. Ent. Fr. (6) vi, pp. 363-368.
A brief account of a short collecting expedition; principally devoted to *Coleoptera*.
5. ALOI, A. Di un nuovo insetto, dannoso alle viti, del genere *Cecidomya*, scoperto nelle vigne della piana di Catania. Atti Acc. Gioen. xix, pp. 277-285, pl. unnumbered. [*Diptera*.]
6. ANCEY, F. Coleoptères d'Afrique. Le Nat. viii, p. 224.
An *Anthia* and a *Cetonia*, presumably new.
7. ANDRÉ, ED. Species des Hyménoptères d'Europe et d'Algérie. Fasc. 24, 25, 26, 12 pls.
Occupied by a supplement to the Ants and Wasps, completing the 2nd vol., pp. 834-917, with Catalogue of *Vespidæ*, *Eumenidæ*, and *Masaridæ*; and by pp. 1-104 of the 3rd vol., which is to be entirely devoted to the *Sphegidae*. There is included description of a doubtfully new Mexican Ant. The portions relating to Ants are by Ernest André.
8. ASHMEAD, W. H. Synopsis of the North-American Subfamilies and Genera of *Cynipidæ*. Tr. Am. Ent. Soc. xiii, pp. 59-64. [*Hymenoptera*.]
9. —. Studies on the North-American *Chalcididæ*, with descriptions of new species from Florida. T. c. pp. 125-135. [*Hymenoptera*.]
34 new species.
10. —. A new Chalcid parasite on the common Basket Worm. Canad. Ent. xviii, p. 97. [*Hymenoptera*.]

11. [ASHMEAD, W. H.] Description of a new Chalcid parasitic on *Mantis carolina*, Say. *T. c.* p. 57. [*Hymenoptera*.]
12. —. On two new *Hemiptera-Heteroptera*. *T. c.* pp. 18-20.
13. ATKINSON, E. T. Notes on Indian *Rhynchota*, No. 5. *J. A. S. B.* iv, pp. 12-83; No. 6, Addenda and Index, *t. c.* pp. 143-223.
140 species of *Homoptera* redescribed: concludes the series.
14. —. Insect-Pests belonging to the Homopterous Family *Coccidæ*. *T. c.* pp. 267-298, and *P. A. S. B.* 1886, pp. 121-123. [*Rhynchota*.]
This is a compilation from the works of Signoret and others, and is intended as an introduction to the study of the E. Indian *Coccidæ*.
15. AURIVILLIUS, C. Insekter insamlade på Kamarun-Berget af G. Valdau och K. Knutson. I, *Coleoptera*, *Cetoniidæ* et *Lucanidæ*. *Bih. Sv. Ak. Handl.* xii, Afd. iv, No. 1, 18 pp.
3 or 4 new or doubtful species and some varieties are described.
16. —. Ett nytt egendomligt släkte bland *Curculioniderna*. *Ent. Tidskr.* 1886, pp. 95-97. [*Coleoptera*.]
17. —. Ett nytt släkte bland *Lamiiderna* från Kamarun. *T. c.* pp. 51-53. [*Coleoptera*.]
18. —. Nya *Coleoptera Longicornia*. *T. c.* pp. 89-94.
5 new species, 1 new genus, from Tropical Africa.
19. —. Bidrag till kännedom om Våra solitära getingars lefnadssätt. *Bih. Sv. Ak. Handl.* xii, Afd. iv, No. 5, 13 pp. [*Hymenoptera*.]
Habits, synonymical and faunistic notes.
20. AUSTAUT, J. L. Des caractères spécifiques chez les *Deilephila*. *Le Nat.* viii, pp. 251-253 & 259-261. [*Lepidoptera*.]
The remarks on the specific characters of these *Sphingidæ* are accompanied by some diagrams, and a key to the determination of the European species.
21. BAER, G. A. Catalogue des *Coleoptères* des Iles Philippines. *Ann. Soc. Ent. Fr.* (6) vi, pp. 97-200.
Comprises about 1100 species, and is accompanied by descriptions of about 36 new species of various families by Bourgeois, Fairmaire, Fauvel, Lefèvre, Olivier.
22. BALBIANI, —. Études bactériologiques sur les Arthropodes. *C.R.* ciii, pp. 952-954.
Some remarks on bacterial diseases in Insects, &c. (Summary *J. R. Micr. Soc.* 1887, p. 70.)
23. BALL, V. On the identification of the Animals and Plants of India which were known to early Greek authors. *P. R. Irish Ac.* (2) ii, pp. 330-334. [*Insects*.]
Four insects are discussed, the Bee, White Ant, Lac Insect, and Sacred Beetle.

24. BALY, J. S. The Colombian Species of the genus *Diabrotica*, with descriptions of those hitherto uncharacterized. Part II. J. L. S. xix, pp. 230-259. [*Coleoptera*.]

Includes 60 species in addition to those recorded last year in the first part of the paper, bringing the total up to 97.

25. —. Descriptions of a new Genus and some new Species of *Galerucidae*, also diagnostic notes on some of the older described species of *Aulacophora*. J. L. S. xx, pp. 1-27. [*Coleoptera*.]

26. —. Descriptions of new genera and species of *Galerucidae*. Tr. Ent. Soc. 1886, pp. 27-39. [*Coleoptera*.]

2 new genera, 31 new species, from Tropical Asia and the Asiatic Archipelago.

27. —. Descriptions of undescribed species of *Diabrotica*. T. c. pp. 443-455. [*Coleoptera*.]

26 species.

— [See also GODMAN & SALVIN.]

28. BAMBEKE, C. VAN. Contribution pour servir à l'histoire de la vesicule germinative. Communication préliminaire. Bull. Ac. Belg. (3) xi, pp. 14-28.

Remarks on the recent observations of Wielowiejski and others.

29. BARBIER, CH. Note sur une espèce nouvelle (?) de *Stenolophus*. Feuille. Nat. xvi, p. 21. [*Coleoptera*.]

30. BARRETT, C. G. Notes on British *Tortrices*. Ent. M. M. xxiii, pp. 1-4. [*Lepidoptera*.]

31. BATES, H. W. On the Geodephagous *Coleoptera* collected by Mr. George Lewis in Ceylon. Ann. N. H. (5) xvii, pp. 68-81, 143-156, & 199-212.

In addition to description of numerous novelties, this comprises many remarks on known species. Walker's species of Ceylon *Geodephaga* have been identified by examination of the typical specimens, and when they are not described by any other author Bates adopts Walker's names, but when the species have since been well described he rejects Walker's names as having no more than catalogue value.

32. —. Tropical African *Coleoptera*, chiefly from the Zanzibar mainland. Ent. M. M. xxii, pp. 188-197, xxiii, pp. 9-13 & 54-57.

Many new *Carabidae* and *Cicindelidae*.

— [See also GODMAN & SALVIN.]

33. BATES, J. E. Descriptions of three new species of *Geometridae*. Canad. Ent. xviii, pp. 74-76. [*Lepidoptera*.]

34. —. *Celiptera bifasciata*, n. sp. T. c. p. 94. [*Lepidoptera*.]

35. BAUDI, F. Rassegna delle specie della famiglia dei *Milabridi* (*Bruchidi* degli autori) viventi in Europa e regioni finitime. Nat. Sicil. v, pp. 1-138 (sep. pag.). [*Coleoptera*.]

Appears practically a reproduction in the Italian language of the next memoir, but apparently has priority. There is an appendix relative to *Urodontides*, pp. 121-136.

36. [BAUDI, F.] *Mylabridum* seu *Bruchidum* (Lin. Schön. All.) europeæ et finitarum regionum Faunæ recensitio. Deutsche E. Z. xxx, pp. 385-416. [*Coleoptera*.]

He includes *Rhæbus* as a subfamily, and tabulates and describes the species; the memoir is at present incomplete; the synonymy given in it is not reproduced in our pages.

37. BEAUREGARD, H. Recherches sur les Insectes Vésicants. J. de l'Anat. Phys. xxi, pp. 483-524, pls. xxii-xxv; & xxii, pp. 83-108 & 242-284, pls. v, vi-ix.

These parts relate entirely to the anatomy of *Coleoptera* of the genera *Cantharis*, *Meloe*, *Mylabris*, and some allies; they are specially mentioned in "Anatomy" and "Systematic." [For summary, vide J. R. Micr. Soc. (2) vi, pp. 235-237, 426, 427, & 966, also *op. cit.* 1887, p. 224.]

38. BECHER, E. Insecten von Jan Mayen. Pp. 59-66, pl. v, of die internationale Polarforschung. Beobachtungs-Ergebnisse, III Band.

This volume bears no date, but was, I believe, published in 1886. 24 species of Insects, 12 of them *Diptera*, were obtained; no *Coleoptera* or *Hymenoptera* were found. Several novelties are described.

39. BECKER, M. A. Hernstein in Niederösterreich, sein Gutsgebiet und das Land im weiteren Umkreise. Vienna: 1886.

The *Insecta* occupy pp. 483-674 of the "Fauna," and are prepared by several entomologists; the *Neuroptera* were recorded from a separate copy last year. It is merely a local list of the Insects of the district, with a few notes, description of 1 new Saw-fly, and reproductions of descriptions of a few species of *Diptera*.

40. BEDEL, L. Faune des Coléoptères du bassin de la Seine, &c. [*Cf. Zool. Rec.* xxii, *Ins.* Titles (19).]

Pp. 201-312 have been published, completing the tabular portion of the volume, and carrying the catalogue to *Sibiria*. This volume was styled "2^e volume" in 1885, and was so recorded by us; it is, however, in 1886, called "2^e partie du 1^{er} volume."

41. BEHR, H. H. New *Lepidoptera*. Bull. Cal. Ac. Sci. 1885, pp. 61 & 62.

3 species of *Noctuidæ* from California.

42. —. Biological synopsis of California *Lepidoptera*. *T. c.* pp. 63-65.

Information as to a small number of species is given in a tabular form.

43. BELING, T. Dritter Beitrag zur Naturgeschichte (Metamorphose) verschiedener Arten aus der Familie der *Tipuliden*. Verh. z.-b. Wien, xxxvi, pp. 171-214. [*Diptera*.]

Describes at length the metamorphoses of 29 species, and gives a table of the characters of the larvæ of several genera and many species.

44. BELING, TH. Beitrag zur Metamorphose der Zweiflügler-Gattung *Sciara* Meig. Wien. ent. Z. v, pp. 11-14, 71-74, 93-96, & 129-134. [*Diptera*.]

Describes the metamorphoses of 24 species.

45. BELON, M. J. Sur la place systématique du genre *Langelandia* Aubé et note synonymique. Ann. Soc. L. Lyon. xxx, pp. 431-436. [*Coleoptera.*]
46. —. Liste des *Lathridiides* décrits postérieurement au Catalogue de Munich. Ann. Ent. Belg. xxx, pp. 88-97. [*Coleoptera.*]
47. BERG, C. Notas sinonimicas acerca de algunos Cerambícidos de la fauna Argentina. An. Soc. Arg. xxi, pp. 234-240. [*Coleoptera.*]
48. —. Observaciones sobre los estados preparatorios de algunos *Lepidópteros* argentinos. T. c. pp. 277-281.
49. BERGROTH, E. Zur Kenntniss der *Aradiden*. Verh. z.-b. Wien, xxxvi, pp. 53-60, pl. ii. [*Rhynchota.*]
 Consists of descriptions of a new genus and several new species, and some remarks on known species.
50. —. Ueber einige amerikanische *Aradiden*. Wien. ent. Z. v, pp. 97 & 98. [*Rhynchota.*]
 One new species, and some synonymical remarks.
51. *BERNHARDT, G. Käferbuch. Eine Anleitung zur Kenntniss der Käfer im allgemeinen. Mit 5 taf. 8 Aufl. Halle : 1886. [Cf. Zool. Anz. ix, p. 657.]
52. BERTKAU, P. Bericht über die wissenschaftlichen Leistungen im Gebiete der Entomologie während des Jahres 1885, Arch. f. Nat. lii (2) pp. 1-328.
53. BIGOT, J.-M.-F. *Diptères nouveaux ou peu connus*. 29^e partie, xxxvii. § 1^{er} Essai d'une classification synoptique du Groupe des *Tanypezidi* (mihi) et description de genres et d'espèces inédits. Ann. Soc. Ent. Fr. (6) vi, pp. 287-302. § 2^e t. c. pp. 369-392.

It is impossible to give an account of the first part of this work, except by saying that it consists of a series of brief statements about classification, and has a table of groups in which two apparently new are proposed, viz., *Diopsidi* and *Phythalmydi*. There is also a synoptic table of the genera of *Tanypezidi*. In the second part of the memoir 2 new genera and many new species are described.

54. BIRTHLER, F. Ueber siebenbürgische *Caraben* und deren nächste Verwandte. Verh. siebenb. Ver. xxxvi, pp. 55-71. [*Coleoptera.*]
 Varieties of 3 species of *Carabus*.
55. BLACKBURN, J., & CAMERON, P. On the *Hymenoptera* of the Hawaiian Islands. Mem. Manch. Soc. (3) x, pp. 194-244.

About 100 species are known, many of them peculiar to the Archipelago ; a large proportion belongs to the *Aculeata*, and it is estimated that there will be many additional (especially in the other groups) discovered. Several new species are described. The memoir appears to have been twice printed, once as cited here, and again in the Proceedings of the same Society, vol. xxv, pp. 134-183.

56. BLAKE, C. A. Monograph of the *Mutillidæ* of N. America. Tr. Am. Ent. Soc. xiii, pp. 179-286. [*Hymenoptera*.]

The very numerous species are described at length, and a good many woodcuts are given. 1 new genus and 21 new species are described.

57. BLOCHMANN, F. Ueber die Eireifung bei Insekten. Biol. Centralbl. vi, pp. 554-559.

Relates to his following memoir, and that of Stuhlmann (Ber. Ges. Freib.).

58. —. Ueber die Reifung der Eier bei Ameisen und Wespen. Fest. Ruperto-Carola Heidelberg. Naturhistorisches Theil, pp. 143-170, pl.

59. —. Ueber die Gründung neuer Nester bei *Camponotus ligniperdus*, Latr., und anderen einheimischen Ameisen. Z. wiss. Zool. xli, pp. 719-727. [*Hymenoptera*.]

Nests are founded by a single female without the aid of workers. The memoir contains also a list of the Ants found at Heidelberg.

60. BOITEAU, P. Suite des résultats obtenus par l'élevage en tubes du *Phylloxera* de la Vigne. C.R. cii, p. 195.

He has now obtained the nineteenth parthenogenetic generation.

61. BOLIVAR, —. Fernando Póo y el Golfo de Guinea. Apuntes de un viaje por Don Amado Ossorio. An. Soc. Esp. xv, pp. 289-348.

The entomological matter is restricted to a list of the Insects brought back by the traveller, pp. 341-348; the only point of much importance is in the *Orthoptera*, of which some novelties are described.

62. —. Apuntes de un viaje por el Sáhara occidental por Don Francisco Quiroga. T. c. pp. 495-518.

A list of a few Insects is appended, the only important part of which is the *Orthoptera* by Bolivar, containing descriptions of two new species and a new genus. Some of the species are from the Canary Islands. A few *Coleoptera* and *Hemiptera* are mentioned, but nothing of other orders.

63. BONNET, —. De quibusdam *Orthopteris* Tunetanis notula. Le Nat. viii, pp. 245-247.

2 new species and brief remarks on 5 others.

64. —. Les insectes antirabiques. Rev. Sci. 1886 (i) p. 379.

This brief note gives particulars of the use of *Mylabris oleæ* as a drug in Tunis.

65. BORRE, A. P. DE. Liste des trois cent quarante espèces de *Coléoptères* carnassiers terrestres actuellement authentiquement capturées en Belgique, avec le tableau synoptique de leur distribution géographique dans le pays. Ann. Ent. Belg. xxx, pp. 7-18.

66. [BORRE, A. P. DE.] Liste des cent dix-sept espèces de *Coléoptères* carnassiers aquatiques actuellement authentiquement capturées en Belgique, avec le tableau synoptique de leur distribution dans le pays. *T. c.* pp. 19-23.
67. —. Descriptions de deux espèces nouvelles de genre *Egidium*, Westwood, suivies de la liste des *Orphnides* du Musée Royal d'histoire naturelle de Belgique. *T. c.* pp. 24-26. [*Coleoptera.*]
68. —. Catalogue des *Trogides* décrits jusqu'à ce jour, précédé d'un synopsis de leurs genres et d'une esquisse de leur distribution géographique. *T. c.* pp. 54-82, pl. iv. [*Coleoptera.*]
69. —. Note sur le genre *Ectinohoplia*, Redt. *T. c.* pp. 83-87. [*Coleoptera.*]
3 new species.
70. —. Liste des *Lamellicornes* laparostictiques, recueillis par feu Camille van Volxem pendant son voyage dans le midi de la péninsule hispanique et au Maroc en 1871. *T. c.* pp. 98-102. [*Coleoptera.*]
71. —. Liste des *Lamellicornes* laparostictiques, recueillis par feu Camille van Volxem pendant son voyage au Brésil et à la Plata en 1872, suivie de la description de dix-huit espèces nouvelles et un genre nouveau. *T. c.* pp. 103-120. [*Coleoptera.*]
72. —. Note sur les genres *Hapalonychus*, Westwood, et *Trichops*, Mannerh. (inédit). *T. c.* pp. 121-124. [*Coleoptera.*]
73. BOS, H. Bijdrage tot de Kennis von den lichaamsbouw der roode boschmier *Formica rufa*, L., 111 pp., 2 pls. Groningen, 1885. [*Hymenoptera.*]

An academical thesis. Discusses the external skeleton ; the alimentary canal ; the number of segments, and position of the stigmata (with remarks on the position of the stigmata of numerous other insects), and gives a list of the Netherlands *Formicidæ*.

74. BOURGEOIS, —. *Lycides* nouveaux ou peu connus recueillis au Brésil. Bull. Soc. Ent. Fr. (6) vi, pp. lxx, lxxxiv, xc, xci, xcvi, cxxx, cxxxii, cxxxix, cxl, cliv, clv, & clxiv. [*Coleoptera.*]

— [See also BAER.]

75. BRAUER, F. Ansichten über die paläozoischen Insecten und deren Deutung. Ann. k. Nat. Mus. i, pp. 87-126, pls. vii & viii.

A general discussion on points connected with palæozoic Insects. Points out the difficulties of determining fossil insects, and that the method is quite distinct from that in use for living insects. Discusses the views of other palæo-entomologists, especially those of Scudder and Brongniart, and then considers several special forms described by these two savants. Concludes with eight propositions : 1, Palæozoic insects do not contradict the views of biologists as to the origin of insects, but postpone this to a very remote period ; 2, the Palæozoic insects do not form a special order, which was the common basis of existing orders ; 3, of existing orders, *Rhynchota*, true *Orthoptera*, *Plecoptera*, *Epheméridæ*,

Odonata, and true *Neuroptera* have Palæozoic representatives, &c., &c. He concludes with a tabulation of the nomenclature of the wing-veins as used by several authors. The plates represent, for comparison, wings of living as well as fossil insects. [For summary, *vide* J. R. Micr. Soc. (2) vi, pp. 970 & 971.]

76. [BRAUER, F.] Nachträge zur Monographie der *Æstriden*. Wien. ent. Z. v, pp. 289-304, pl. iv. [*Diptera*].

Relates to a Fly whose larva inhabits the nasal and frontal cavities and throat of horses.

77. *——. Beziehungen der Larvenformen der Thière zur Abstammung. Vienna : 1886, 24 pp. (*cf.* Wien. ent. Z. v, p. 237).

According to the notice in the Wiener Zeit., this is a popular work.

78. BRENSKE, E. Ueber *Melolonthiden*. Deutsche E. Z. xxx, pp. 195-207. [*Coleoptera*].

Consists of descriptions of new species of *Rhizotrogus*, with a few synonymical and varietal remarks.

79. BRENT, C. Notes on the *Æcodomas*, or leaf-cutting Ants of Trinidad. Am. Nat. xx, pp. 123-131, woodcuts. [*Hymenoptera*].

Habits of several unidentified species.

80. BREITHAUPT, P. F. Ueber die Anatomie und die Functionen der Bienezunge. Arch. f. Nat. lii, pp. 47-112, pls. iv & v. [*Hymenoptera*]. [For summary, *vide* J. R. Micr. Soc. 1887, pp. 224 & 225.]

81. BRIDGMAN, J. B. Further additions to the Rev. T. A. Marshall's Catalogue of British *Ichneumonidae*. Tr. Ent. Soc. 1886, pp. 335-373. [*Hymenoptera*].

BRISCHKE, D. [See HELM, —.]

82. *BRONGNIART, —. Insectes fossiles des terrains primaires. Avec 3 pl. In Compt. rend. xxiii, Réunion. Soc. sav. à la Sorbonne, 1885. [*Cf.* Zool. Anz. ix, p. 121.]

83. BRUCE, A. T. Observations on the nervous system of Insects and Spiders, and some preliminary observations on *Phrynus*. J. Hopk. Univ. Circ. vi, p. 47. [For summary, *vide* J. R. Micr. Soc. 1887, p. 223.]

84. —. Observations on the embryology of *Insects* and *Arachnids*. *Op. cit.* v, p. 85.

Abstract of a thesis for the degree of Doctor of Philosophy. "The insects studied included representatives from the *Lepidoptera*, *Coleoptera*, and *Orthoptera*, while a few incomplete observations were made in the embryology of the *Neuroptera*, and on the maturation of the ovum in *Musca*." [For summary, see J. R. Micr. Soc. (2) vi, p. 590.]

85. BRUNER, L. First contribution to a knowledge of the *Orthoptera* of Kansas. Bull. Washb. Coll. i, pp. 125-139.

88 species, 4 new, and observations on characters and habits of several others.

86. BROWN, THOS. Manual of the New Zealand *Coleoptera*. Parts III & IV., published by command. Wellington, N.Z. : 1886.

This consists of several series of supplementary descriptions of species, mostly new, altogether about 440 in number. Just about one half of this number are reprints of descriptions that previously appeared in the New Zealand Journal of Science, and have been recorded in previous volumes of the ZOOLOGICAL RECORD.

87. BROWN, —. Trois *Lepidoptères* nouveaux. Act. Soc. L. Bord. xl, pp. lii & liii.

1 *Geometridæ*, 2 *Tineidæ* from the Bordeaux district.

88. BUCKLER, W. The larvæ of the British Butterflies and Moths, Edited by H. T. Stainton. Vol. I. The Butterflies ; pp. xvi & 202, pls. xvii. London : Ray Society. [*Lepidoptera*.]

This consists of descriptions and figures ; but of 4 species there are no descriptions, and of 3 species no figures. Several stages in the development of each species are usually represented. Much detail is given in the descriptions, and pp. 145–198 have been drawn up by Mr. Hellins with the view of supplying some of the gaps in Mr. Buckler's descriptions. There is a list of Hymenopterous parasites bred from the larvæ of the Butterflies. [Reviewed, Ent. M. M. xxiii, pp. 17–23, and Ent. xix, p. 71.]

89. BUCKTON, G. B. Notes on the occurrence in Britain of some undescribed *Aphides*. Tr. Ent. Soc. 1886, pp. 323–328, pls. iv–vii. [*Rhynchota*.]

90. BUGNION, E. Les mœurs de l'*Hylesinus oleiperda* et les galeries du *Phlebotribus oleæ*. MT. schw. ent. Ges. vii, pp. 218–225, pl. [*Coleoptera*].

H. oleiperda, in Switzerland, the olive being absent, attacks lilac.

91. BUTLER, A. G. An account of two collections of *Lepidoptera* recently received from Somali-land. P. Z. S. 1885, pp. 756–776, pl. xlvii.

55 species — 52 of them *Rhopalocera* — are noticed, many of them new. A table is added to show the relationship of the *Lepidoptera* of Somali to those of Aden, Abyssinia, Kilima-njaro, and Natal. Several errors in the works of other Lepidopterists are pointed out. Mabille (in Grand. Hist. Madagascar) is said to have included erroneously several Aden species, as being from Madagascar. The Somali collections were made by Major Yerbury and Messrs. Thrupp, Lort-Philipps, and James.

92. —. On *Lepidoptera* collected by Major Yerbury in Western India. P. Z. S. 1886, pp. 355–391, pl. xxxv.

Includes 89 species of *Rhopalocera* and the same number of *Heterocera*. The list is accompanied by many comments, and contains descriptions of 8 new Butterflies, and 19 species, and a new genus of *Heterocera*.

93. —. Note on *Aporia hippia*. P. Z. S. 1886, pp. 80 & 81. [*Lepidoptera*.]

94. [BUTLER, A. G.] Description of two new species of *Teracolus*. Ent. M. M. xxiii, pp. 29 & 30. [*Lepidoptera*.]

Includes also numerous remarks on *Teracolus* and allied genera as figured in Standing's work.

95. —. Descriptions of 21 new genera and 103 new species of *Lepidoptera-Heterocera* from the Australian region. Tr. Ent. Soc. 1886, pp. 381-441, pls. ix & x.

96. —. On a collection of *Lepidoptera* made by Commander Alfred Carpenter, R.N., in Upper Burma. Ann. N. H. (5) xviii, pp. 182-191.

65 species, mostly *Rhopalocera*, of which there are 5 new.

97. —. Descriptions and remarks upon five new *Noctuid* Moths from Japan. Tr. Ent. Soc. 1886, pp. 131-136. [*Lepidoptera*.]

98. —. Notes on the genus *Terias*, with descriptions of new species in the collection of the British Museum. Ann. N. H. (5) xvii, pp. 212-225, pl. v. [*Lepidoptera*.]

This paper is noticed by Distant, t. c. pp. 377-381, and again by Butler, p. 468.

99. —. Description of a hitherto unnamed Butterfly from Madeira. T. c. p. 430. [*Lepidoptera*.]

100. —. Description of a Moth of the Genus *Milionia*, from Borneo. Op. cit. xxviii, p. 7. [*Lepidoptera*.]

101. —. Illustrations of typical specimens of *Lepidoptera-Heterocera* in the collection of the British Museum, Pt. vi. London: 1886, pp. xv & 90, pls. ci-cxx.

Relates to Moths of Northern India; in addition to figuring numerous species that have been previously described by Walker and others, several descriptions and figures of entirely new species are given. The generic positions of many of Walker's species are changed.

102. BUYSSON, R. DU. Description d'une nouvelle espèce de *Chryside*. Rev. d'Ent. v, p. 151. [*Hymenoptera*.]

103. CALLONI, S. Larve di *Cecidomyia* sulla viola odorata, con regolare fillodia dei fiori primaverile ed estivo. Rend. ist. Lomb. (2) xix, pp. 220-240. [*Diptera*.]

Miscellaneous particulars as to the habits &c., of a larva presumed to be a *Cecidomyia*.

104. CALVERT, W. B. Catálogo de los *Lepidópteros*, *Rhopaloceros*, i *Heteroceros* de Chile. An. Un. Chile. lxix, pp. 1-44.

Includes 455 species, of which 89 are *Rhopalocera*.

105. CAMBOUÉ, P. *Bombyciens* sericigènes de Madagascar. Bull. Soc. Acclim. (4) iii, pp. 508-512. [*Lepidoptera*.]

Gives some particulars as to 2 or 3 species of *Borocera*, one of which is treated as new.

106. CAMBRIDGE, O. P. Notes on *Lycæna argiades*, Pall.: a Butterfly, new to Britain. P. Dors. N. H. vii, pp. 79-83, pl. v. [*Lepidoptera*.]
107. CAMERON, P. On some *Hymenoptera*, chiefly undescribed, from Japan and the Pacific. P. N. H. Soc. Glasg. (n.s.) i, pp. 263-278.
108. —. A new species of *Allantus* from Salonica. T. c. p. 277. [*Hymenoptera*.]
109. —. Biological notes. T. c. pp. 295-304. [*Insecta*.]

Contents:—1, On some Mite-Galls; 2, on galls of *Cecidomyiæ*; 3, abundance of the galls of *Neuroterus* in 1884; 4, on Fungoid galls; 5, on an abnormal female of *Acilius fasciatus*; 6, the hot-house *Thrips*; 7 and 8, on 4 new species of *Belyta*.

110. —. The Fauna of Scotland; with special reference to Clydesdale and the Western district. *Hymenoptera*, pt. ii. Glasgow: 1886.

Consists of a supplement to the *Tenthredinidæ* published in pt. i (1878), enumerating additions and alterations of names; a revision of the *Cynipidæ*, in accordance with Adler's and with Mayr's researches, the genera being tabulated, the species catalogued, with descriptions of new species, and a synopsis of the oak-galls of Scotland. [Extract in Scot. Nat. (n.s.) i, pp. 300-302.]

111. —. A Synopsis of the British species of *Cephina*. Ent. M. M. xxii, pp. 175-177. [*Hymenoptera*.]

— [See also BLACKBURN and GODMAN & SALVIN.]

112. CANDÈZE, E. Note sur les *Elatérides* du genre *Chalcolepidius*. C.R. ent. Belg. 1886, pp. lxx-lxxiv. [*Coleoptera*.]

Analytical table and catalogue of all the species (58), with description of several new species.

113. CANUS, —. Die Hönigbiene im alten Indien. Eine Kulturgeschichtliche Skizze. B. E. Z. xxx, pp. 65-71.

Some remarks on references to the Honey-bee in old Oriental literature.

114. CAPRONNIER, J. B. Note sur des *Lépidoptères* recueillis en 1884 à l'île de Waigiou par M. Van Renesse-Van Duivenbode. Ann. Ent. Belg. xxx, pp. 1-6.

A list of 58 species; none are new, but there are remarks on a few species of *Rhopalocera*.

115. CARNOY, J. B. La cytodierèse chez les Arthropodes. La Cellule i, pp. 191-440, pls. i-viii.

116. CARRIÈRE, J. Kurze mittheilungen aus fortgesetzten Untersuchungen über die Sehorgane. Zool. Anz. ix, pp. 141, 479, & 496.

These miscellaneous observations relate to—1, The double eyes of some male Insects; 2, Aconous and pseudoconous eyes in Insects; 3, Number and position of the cells of the retinula in *Musca*, *Culex*, and

Bibio ; 4, Ocelli in *Diptera* and *Orthoptera* ; . . . 6, The eyes of *Gyrinus natator*, *Bibio* and *Cloë diptera* ; 7, The development and the different sorts of ocelli. [For Summary, *vide* J. R. Micr. Soc. (2) vi, pp. 424 & 963.]

117. CASEY, T. L. Revision of the Californian species of *Lithocharis* and allied genera. Bull. Cal. Ac. Sci. ii, p. 1-40. [*Coleoptera*.]

25 species, all new. The tabulation is altered in a later paper (below), to bring it into conformity with the arrangement of the Central-American forms as published in Biol. Centr. Am. Col. i, pt. 2. The memoir contains also a description of a *Lamellicorn*.

118. —. Descriptive notices of N. American *Coleoptera*. Bull. Cal. Ac. Sci. ii, pp. 157-263, pl. vii.

This is the first of a series of papers proposing to deal with all the New World north of the Isthmus of Darien. The introductory part contains matter of general interest to Coleopterists and other entomologists.

CHAMPION, G. C. [See GODMAN & SALVIN.]

119. CHATIN, J. Morphologie comparee du labium chez les *Hyménoptères*. C.R. cii, pp. 222-224.

120. —. Sur le labre des *Hyménoptères*. *T. c.* pp. 632-634. [For Summary, *vide* J. R. Micr. Soc. (2) vi, p. 427.]

121. CHESHIRE, F. R. Bees and beekeeping: Scientific and Practical. Vol. i. Scientific. London: pp. vii & 336, pls. viii, and 71 woodcuts.

Contains a large amount of valuable and varied information. [Noticed, J. R. Micr. Soc. (2) vi, p. 233.]

122. CHOLODKOVSKY, N. Zur Morphologie der Insectenflügel. Zool. Anz. ix, pp. 615-618, woodcut.

The writer insists that in *Lepidoptera* the prothorax is by no means soldered with the mesothorax, and he figures some prothoracic appendages of *Geometra papilionaria*, which he considers to be rudimentary prothoracic wings. Haase, *t. c.* p. 711, points out that these structures are well known, and are not rudimentary wings. [For Summary, *vide* J. R. Micr. Soc. 1887, p. 74.]

123. CIACCIO, G. V. Della minuta fabrica degli occhi de' *Ditteri*. Mem. Acc. Bologn. (4) vi, pp. 605-659.

This is practically the letter-press of a memoir of which the plates were published last year [Zool. Rec. xxii, *Ins.*, Ciccio (75)], and gives particulars as to the minute structure of the eye in a great variety of *Diptera*. [Translation into French, Journ. Microgr. x, pp. 115, &c.]

124. *CIESIELSKI, T. Bartnictwo czyli hodowla pszczół. (Die Zeidelei oder die Bienenzucht.) Lemberg: 1885, 78 pp. (*cf.* Zool. Anz. ix, p. 418).

125. CIOFALO, S. Catalogo dei *Coleotteri* dei dintorni di Termini Imerese. Atti Acc. Gioen. xix, pp. 181-212.

126. COQUILLETT, D. W. The North-American species of *Toxophora*. Ent. Am. i, pp. 221 & 222. [*Diptera*.]

2 new species.

127. —. Monograph of the *Lomatina* of North America. Canad. Ent. xviii, pp. 81-87. [*Diptera*.]

1 new genus and several new species. [Cf. Röder, Wien. ent. Z. v, pp. 263-265.]

128. —. The North-American genera of *Anthracina*. Canad. Ent. xviii, pp. 157-159. [*Diptera*.]

129. COSTA, A. Osservazioni intorno al genere *Salix* di Fabricio e species italiane dello stesso. Atti ist. Nap. (3) v, Mem. 10, pp. 1-10, pl. [*Hymenoptera*.]

The 5 Italian species are figured and described, and synonymy given.

130. —. *Imenotteri* italiani famiglie dei Pompilidei, Scolidei, Tifidei, Sapigidei e Mutillidei. Rend. Acc. Nap. xxv, pp. 281-283.

Brief remarks on these families with reference to the Italian fauna, and diagnoses of 6 new species.

131. —. Notizie ed osservazioni sulla Geo-Fauna Sarda; memoria quinta (risultamento delle ricerche fatte nel mese di maggio). *Op. cit.* xxiv, pp. 322-324.

Diagnoses of 10 new species of *Ichneumonidae*, and 2 of *Diptera*. Observations on a few insects of other orders.

132. —. Notizie ed osservazioni sulla Geo-Fauna Sarda, memoria sesta. (Ricerche fatte ne mesi di luglio ed agosto 1885.) *Op. cit.* xxv, pp. 51-53.

Diagnoses of new species: 3 *Coleoptera*, 1 *Dipteron*, 4 *Hymenoptera*, 1 *Lepidopteron*.

133. DAHL, F. Die Fussdrüsen der Insekten. Arch. mikr. Anat. xxv, pp. 236-262, pls. xii & xiii.

Relates to the minute structure of the tarsi so far as the clinging-hairs and glands are concerned: the first half being devoted to the hairs, the second to the glands. The functions are only briefly considered, but it is assumed that the structures are for clinging purposes. In *Coleoptera* some of the glands open into the canals of the hairs. A large part of the memoir is devoted to *Coleoptera*, but the other orders are treated at greater or less length. The plates give a good idea of the structures highly magnified. [Review, Emery, Biol. Centralbl. v, p. 656.]

134. DALLA-TORRE, K. W. v. Heterotrophie. Ein Beitrag zur Insektenbiologie. Kosmos, xviii, pp. 12-19. [*Hymenoptera*.]

Relates to *B. gerstaeckeri*, Mor., and other species of *Bombus*, and their visits to flowers in the Alps.

135. *DELAMOTTE, D. E. Monographie du *Phylloxera vastatrix*, de la maladie phylloxérique de la vigne et des Cépages américains. T. 1, Alger: 1885. [Cf. Zool. Anz. ix, p. 123.]

136. DELPINO, F. Funzione mirmecofila nel Regno vegetale. Prodrómo d'una monógrafia delle piante formicarie. Mem. Acc. Bologn. (4) vii, pp. 215-323.

This is a botanical paper, but it will interest entomologists to know of its existence. He confirms Belt's views as to the relations between plants and Ants.

137. DEMOOR, J. Liste des *Cicindélides* décrits postérieurement au Cataloge de Munich. Ann. Ent. Belg. xxx, pp. 46-53. [*Coleoptera*.]

In this period of eighteen years 230 new species have been described.

DENNY, A. [See MIALLE & DENNY.]

138. DENT, H. C. A Year in Brazil. London: 1886, 444 pp.

Contains lists of *Lepidoptera* and *Coleoptera* collected, remarks on other Insects, and a chapter on mimicry.

139. DEWITZ, H. Von Herrn Dr. Pogge in Mukenge und Umgegend gesammelte *Rhopaloceren*. B. E. Z. xxx, pp. 301 & 302, pl. vii.

2 new species.

140. —. Neue westafrikanische *Tagschmetterlinge*. Deutsche E. Z. xxx, pp. 427-430, pl. ii. [*Lepidoptera*.]

9 species.

141. DIMMOCK, G. *Belostomidae* and some other fish-destroying bugs. Ann. Rep. Fish & Game Com. Mass. 1886, pp. 67-74.

In addition to information about the Bugs, this contains an account of the literature of fish-destroying Insects.

142. DISTANT, W. L. *Rhopalocera* Malayana. Pts. xi & xii, pp. 365-481, pls. xxxiii-xliv.

These parts contain the *Hesperiidae* and a supplement completing the work.

143. —. Contributions to a Knowledge of Malayan Entomology. Pt. iv, Ann. N. H. (5) xvii, pp. 251-254, & pt. v, pp. 530-532. [*Lepidoptera*.]

8 new species and a new genus of Butterflies; also figured and described in Rhop. Malayana.

144. —. Descriptions of new species and a new genus of *Rhopalocera* from the Malay Peninsula. Ent. xix, pp. 11 & 12.

145. DOHRN, C. A. Exotisches. S. E. Z. xlvii, pp. 127, 128, 188-192, 311-317, & 350-354. [*Coleoptera*.]

Miscellaneous remarks on various species throughout the order. One novelty is described.

146. —. Paussidische Nachreden. T. c. pp. 120-127. [*Coleoptera*.]

147. DOHERTY, W. A list of Butterflies taken in Kumaon. J. A. S. B. iv, pp. 103-140. [*Lepidoptera*.]

The list extends to 270 species, and is preceded by remarks on the distribution of Butterflies in the Himalayas. He has studied the egg, and believes it will afford characters for defining the families and subfamilies,

and gives generalizations and a classification made from this point of view. He states that in the *Hesperidæ* a sort of hermaphroditism must exist, as he has taken eggs out of the body of a male in two or three species. He also gives notes on the relations between Ants and larvæ of *Lycaenidæ*. Many remarks are made as to synonymy, and several new species described.

148. —. Additional notes on new or rare Indian Butterflies. *T. c.* pp. 256-265. [*Lepidoptera*.]

A new genus and 8 new species.

149. DOUGLAS, J. C. The Hive-Bees indigenous to India and the Introduction of the Italian Bee. *J. A. S. B.* lv, pp. 82-96. [*Hymenoptera*.]

150. DOUGLAS, J. W. Notes on some British *Coccidæ*. *Ent. M. M.* xxii, pp. 243-250, xxiii, pp. 25-29, 77-82, & 150-155. [*Rhynchota*.]

Gives a great deal of information: list of the plants attacked, comments on habits, synonymy, notices of structural characters, in addition to the description of some species believed to be new.

151. DRUCE, H. Descriptions of some new species of *Heterocera* from Tropical Africa. *P. Z. S.* 1886, pp. 409-411, pls. xxxvii & xxxviii. [*Lepidoptera*.]

7 species of *Saturniidæ* and *Lasiocampidæ*.

— [See also GODMAN & SALVIN.]

152. DUBOIS, R. De la fonction photogénique chez les Podures. *C.R. Soc. Biol.* (8) iii, 600 pp. [*Neuroptera*.]

Relates to *Lipura armata*, Tullb.

153. —. Application de la méthode graphique à l'étude des modifications imprimées à la Marche par les lésions nerveuses expérimentales chez les Insectes. *Op. cit.* ii, pp. 642-644.

154. —. Contribution à l'étude de la production de la lumière par les êtres vivants. Les *Elatérides lumineux*. *Bull. Soc. Z. Fr.* 1886, pp. 1-275, pls. i-ix. [*Coleoptera*.]

Finding that at present no generalization is possible as to the production of light by living beings, the author presents this voluminous memoir as the first of a proposed series of researches on this subject. It is devoted specially to *Pyrophorus noctilucus*, examples having been obtained from the island of Guadeloupe. He gives an extensive bibliography and historical *resumé*, and then a chapter on the general characters of the *Elatéridæ*, with special reference to *Pyrophorus*. He obtained eggs which he found to be luminous; discusses at great length (pp. 43-55) certain luminous larvæ which have been previously (apparently in all cases erroneously) supposed to be those of *Elatéridæ*; and (pp. 55-64) describes the larva of *Pyrophorus noctilucus*—it is luminous, and the larvæ fight furiously, giving off light in a flashing manner while doing so. Chapter iii is devoted to the anatomy of the perfect insect: skeleton, digestive, circulatory, and respiratory apparatus, nervous system, and reproductive organs. Chapter iv is given to the anatomy and histology

of the luminous organs. The second part of the memoir gives an account of many experiments he made on living insects, describes at great length the properties of their light, by means of which he was able to obtain photographs; he then considers the influence of mechanical, physical, chemical, and toxic agents on the production of the light, and this is followed by a chapter in which he discusses the various functions and their relations to the luminosity. The vital activity of the luminous organs seems to be very similar to that of the muscular system. Pp. 269-272 give a summary of his conclusions. In addition to the plates illustrative of the different parts of the memoir, there is given a photograph, executed by means of the light of *Pyrophorus*, of a bust of Claude Bernard. [For Summary, *vide* J. R. Micr. Soc. (2) vi. pp. 595-597.]

155. DUDA, L. Beiträge zur Kenntniss der Hemipteren Fauna Böhmens. Wien. ent. Z. v, pp. 15, &c.-262.

This catalogue of *Heteroptera* is now completed; it comprises 495 species.

156. DUGÈS, EUG. Métamorphoses de quelques Coléoptères mexicains. Ann. Ent. Belg. xxx, pp. 27-45, pls. i-iii.

8 species belonging to several families. [Translated in Nat. Mex. vii, pp. 208-311.]

157. DÜSING, C. Ueber die Farbung und Zeichnung der Thiere. Kosmos, xix, pp. 382-393 & 453-463.

The first part of this relates to Eimer's studies as to the coloration of *Lacerta muralis*, and is not entomological; but at p. 392 he enters on a consideration of Weismann's researches on the colours of larvæ of *Sphinxidae*, which he considers support Eimer's theory. Brook's theory of heredity also is discussed.

158. DZIEDZICKI, H. Beitrag zur Fauna der zweiflügeligen Insecten. Arten der Gattungen *Mycothera*, *Mycetophila*, und *Stegeria*. Wien. ent. Z. v, pp. 153, 189, 229, 251, 265, 326, 346, vi, p. 37. [Diptera.]

This is a translation from the Polish of portions of a paper that appeared in *Pamiętnik Fizylog.* v, Warschau, 1885. The original memoir was accompanied by five plates, and has not been seen by the Recorder.

159. EDWARDS, J. A Synopsis of British Homoptera-Cicadina. Tr. Ent. Soc. 1886, pp. 41-129, pls. i & ii.

Comprises, besides matter of general interest, tables and descriptions of the genera and species; the latter are 120 in number, 50 belonging to *Liburnia*. The plates are devoted to structural details. A second part will complete the memoir. 15 of the species are not yet known to occur outside our islands.

160. EDWARDS, H. Notes on North American *Zygantidae* and *Bombycidae*, with descriptions of new forms. Ent. Am. ii, pp. 8-15. [Lepidoptera.]

18 new species and a few varieties and remarks.

161. —. Apparently new forms of North American *Heterocera*. T. c. pp. 165-171. [Lepidoptera.]

12 species and some varieties.

162. EDWARDS, W. H. Miscellaneous notes on Butterflies, their larvæ, &c. *Canad. Ent.* xviii, pp. 14-18. [*Lepidoptera.*]
163. —. Description of new species of Butterflies found in the United States. *T. c.* pp. 61-65. [*Lepidoptera.*]
2 of *Argynnis*, 1 of *Melitæa*.
164. EICHOFF, W. Zwei neue ost-indische *Scolytiden* Gattungen. *Notes Leyd. Mus.* viii, pp. 24-26. [*Coleoptera.*]
165. ELWES, H. J. On Butterflies of the genus *Parnassius*. *P. Z. S.* 1886, pp. 6-53, pls. i-iv. [*Lepidoptera.*]

The formation of the peculiar pouch of the ♀ is discussed, and an account given of the copulation of *P. apollo*. There is a table of the distribution of the species, and remarks on classification suggesting that *Parnassius*, *Eurycyus*, *Euryades*, and *Lühdorfa* should be separated from *Papilionidæ* to form a separate family. 23 species of *Parnassius* are recognized, and the synonymy, which is somewhat intricate, is fully discussed. The species are dealt with seriatim, and a large amount of information, including much original, about these Butterflies is brought together. The plates are devoted to the ♂ and ♀ external sexual organs. [For extracts and review, *vide* Möschler, *S. E. Z.* 1887, pp. 21-41.]

166. EMERY, C. Ueber Phylogenie und Systematik der Insekten. *Biol. Centralbl.* v, pp. 648-656.

A statement of his views relative to the subjects discussed by Brauer in *Systematisch-Zoologische Studien*.

167. —. Ueber dimorphe und flügellose Männchen bei *Hymenopteren*. *T. c.* pp. 686-689.

Relates to Mayr's recent work on Fig Insects and Adlerz's on *Formicæ natus nitidulus*.

168. —. Alcune formiche africane descritte da. *Bull. Soc. Ent. Ital.* xviii, pp. 355-366, pl. xvii. [*Hymenoptera.*]
12 novelties described.

169. —. La luce negli amori delle Lucciole. *Bull. Ent. Ital.* 1886, pp. 406-411. [*Coleoptera.*]

He finds by experiments that the sexes of the Firefly (presumably *Luciola italica*) recognise one another by means of their light, and perform a sort of duet, the rhythm of the light of the female being different from that of the male.

170. —. Mimetismo e costumi parassitari del *Camponotus lateralis*, Ol. *T. c.* pp. 412 & 413, [*Hymenoptera.*]

The red race joins in the processions of a Red Ant which it resembles, and the black race in the processions of some Black Ants. He thinks the species thus attains access to the hoards of these species.

171. EPPELSHEIM, E. Neue *Staphylinen* von Amur. *Deutsche E. Z.* xxx, pp. 33-46. [*Coleoptera.*]

— [See also RADDE.]

172. EXNER, S. Ueber Cylinder welche optische Bilder entwerfen. Arch. ges. Phys. xxxviii, pp. 274-290.

A contribution to the physics of optical science discussing the formation of images by lenses of peculiar form, each facet of the insect eye being treated as actually a cylindrical lens. The memoir is largely mathematical.

173. FABRE, J. H. Souvenirs entomologiques (troisième série). Études sur l'instinct et les mœurs des Insectes, 433 pp. Paris: 1886.

This is not only an account of a series of most remarkable and ingenious observations on the habits of Insects, but is also a very weighty polemic from the point of view of an observer of instinct against the theory of transformism, or common descent. It contains some highly remarkable histories of metamorphoses in various orders, *Hymenoptera* being, however, the Insects most largely dealt with. There are twenty chapters:—The first four are devoted to the habits of *Scolia*, more especially *S. bifasciata*, and the manner in which its larva lives at the expense of the larva of *Cetonia*; and he argues that the remarkable combination of perfect instinctive actions he portrays for us, could never have arisen by natural selection from ancestors with other instincts. This, indeed, is the leading idea of the book, to display the wonderful and minute perfection of the instinctive actions necessary for the maintenance of the existence of the species, and to show that the existence being only maintained by this perfection, we are bound down to a theory of uniformity. v. Les parasites, is chiefly devoted to the theory of mimicry, which he considers to be an illusion that should be allowed to pass into oblivion. vi. La theorie du parasitisme, discusses the variety of instincts and habits included under the term parasitic, and shows that parasites work quite as hard as the insects they prey on, and have an organization specially adapted to their lives, thus rejects the theory that parasitism arose from occasional indulgence in habits of preying, and that these gradually became confirmed. vii. Les tribulations de la Maçonne, relates to the habits of *Chalicodoma muraria* and *pyrenaica*, and the insects that live at their expense, or take possession of their constructions. The next three chapters are devoted to details of the modes in which three of these insects—*Anthrax trifasciata*, *Leucospis gigas*, and *Monodontomerus cupreus*—destroy the larva of the *Chalicodoma*. xi. Le dimorphisme larvaire, gives an account of the discovery of two totally different forms of larva in *Anthrax trifasciata*, *Leucospis gigas*, *Sapyga punctata*, and probably also in *Myodites subdipterus*; the first form he calls the form of acquisition; it does not take nourishment, but has, for sole object, to obtain possession of the food, and this done, undergoes a complete change of external structure. xii. Concerns the habits of species of *Tachyta*, more especially of *Tachyta*, n. sp.?, and the manner in which it paralyses *Mantis religiosa*. xiii describes the metamorphoses of *Cerocoma schæfferi*, *Mylabris 12-punctata*, and *Zonites preusta*. xiv. Changement de régime, concerns the difficulty in effecting a change of habits among the predaceous *Hymenoptera*, the subject being continued in the next chapter, “une piqure au transformisme,” in which he argues

that it is impossible to imagine that these Insects of divers habits, which they cannot change, had a common ancestor. The last four chapters give the results of a remarkable series of observations and experiments on the sex of the egg : having observed that the amount of food provided by certain *Hymenoptera* for the offspring varied much, he farther observed that the quantity had a relation to the sex of the perfect Insect produced from the larva that had consumed the food ; he also found that the quantity did not determine the sex, but that this is decided by the insect when laying the egg ; and he discovered that the female Hymenopteron lays either a ♂ or ♀ egg, according to her own choice ; he also found that the sex of the egg is not decided by its fecundation, or non-fecundation, from the receptaculum seminis, and he considers that the mode by which the Insect influences or selects the sex of the egg is quite unknown. [The work is discussed by Fol (201), Mauvezin (427), and Nicolas (487).]

174. FAIRMAIRE, L. Note sur les *Coléoptères* recueillis par M. Laligant à Obock. Ann. Soc. Ent. Fr. (6) v, pp. 435-462.

101 species are enumerated, 34 of them new, with 3 new genera.

175. —. Notes sur les *Coléoptères* recueillis par M. Raffray à Madagascar et descriptions des espèces nouvelles. *Op. cit.* vi, pp. 31-96, pl. ii.

176. —. Descriptions de *Coléoptères* de l'intérieur de la Chine. *Op. cit.* vi, pp. 303-356.

Describes about 90 new species, representing a large number of the families of the order. European and Asiatic forms are here found together.

177. —. Diagnoses de *Coléoptères* nouveaux. *Coléoptères* de la Chine. Le Nat. viii, p. 223.

— [See also BAER.]

178. FAUST, J. Bemerkungen zu einigen europäischen *Curculioniden*-Gattungen. S. E. Z. xlvii, pp. 22-31. [*Coleoptera.*]

A discussion, in connection with Bedel's Faune Col. Seine, as to the systematic positions of certain genera of *Eirrhiniini*, &c.

179. —. Beschreibung neuer *Anchondium* Arten aus dem Caucasus. T. c. pp. 32 & 33. [*Coleoptera.*]

180. —. Bemerkungen zur Gruppe der *Brachyderiden* und Beschreibung einiger neuen Arten. T. c. pp. 33-38. [*Coleoptera.*]

Contains some important observations on the classification of the *Brachyderides* and *Otiorynchides*.

181. —. Verzeichniss auf einer Reise nach Kashgar gesammelter *Curculioniden*. T. c. pp. 129-157. [*Coleoptera.*]

A list of the species obtained by Stoliczka : many new species and some new genera.

132. [FAUST, J.] Berichtigung meiner Bemerkungen über die Gattungen *Cyclomaurus* and *Auchmeresthes*. B. E. Z. xxx, pp. 97 & 98. [Coleoptera.]

A new genus proposed.

183. —. Ueber die systematische Stellung der Gattungen *Aosseterus*, Sch., und *Rhadinomus*. T. c. pp. 99–102. [Coleoptera.]

1 new species in addition to information on taxonomy.

184. —. Neue exotische Rüsselkäfer. Deutsche E. Z. xxx, pp. 337–372. [Coleoptera.]

33 species from several regions, and numerous new genera.

185. —. Verzeichniss der von Herren Wilkins und Grumm-Grshimailo in Turkestan, Buchara und im Pamir gesammelten *Curculioniden* eingesendet vom Herrn Wladimir Dochturov. Hor. Ent. Ross. xx, pp. 141–178. [Coleoptera.]

Describes 3 new genera, 24 new species, and includes many remarks on the characters of little-known or difficult species.

186. —. Insecta in itinere A. N. Przewalskii in Asia centrali, novissime lecta. II. *Curculionidæ*. T. c. pp. 250–267. [Coleoptera.]

Several new species, and 2 new genera.

187. FAUVEL, A. Les *Staphylinides* du Nord de l'Afrique. Rev. d'Ent. v, pp. 9–100. [Coleoptera.] Also published separately under the title Notices Entomologiques. Neuvième partie, pp. 1–92.

Includes 555 species of 103 genera; several novelties are described in its pages.

188. —. Description d'un genre nouveau de *Staphylinides* de France. T. c. pp. 111–113. [Coleoptera.]

189. —. Description d'un *Bythinus* nouveau de France. T. c. p. 125. [Coleoptera.]

190. —. *Staphylinides* des Iles Philippines. T. c. pp. 143–150, [Coleoptera.]

191. —. Essai sur l'Entomologie de la Haute-Auvergne. T. c. pp. 265–317. [Coleoptera, Orthoptera.]

A list of *Coleoptera* (with 2 new species), and 25 species of *Orthoptera*, this latter is by Finot.

— [See also BAER (21).]

192. FERNALD, C. H., & SMITH, J. B. On some of the genera of our *Sphingidæ*. Ent. Am. ii, pp. 2–8. [Lepidoptera.]

Discusses some minor points of nomenclature and classification of N. American forms; but some of the questions of nomenclature, e.g., *Ægeria* and *Sesia*, relate also to other faunæ.

193. *FERNALD, C. H. The *Sphingidæ* of New England. Orono: 1886, 85 pp., 6 pls. (cf. Ent. Am. ii, p. 44.) [Lepidoptera.]

— [See also RILEY (608).]

194. FIELDER, M. Fishing lines and ligatures from the Silk-glands of *Lepidopterous* larvæ. P. Ac. Philad. 1886, pp. 298 & 299.
195. FIORI, A. Saggio di un Catalogo dei *Coleotteri* del Modenese e del Reggiano. Atti Soc. Mod. Mem. xx, pp. 1-25 & 97-112.
196. —. Note entomologiche. Bull. Ent. Ital. 1886, pp. 414-417. [*Coleoptera*.]
Relates to *Ancylopus* and *Malchinus*.
197. FLACH, K. Ein blindes *Ptilium*. Deutsche E. Z. xxx, p. 248. [*Coleoptera*.]
198. FLETCHER, J. Report of the Entomologist, 1885, Dept. of Agr. Ottawa, 56 pp.
Miscellaneous information about Insects injurious in Canada. Illustrated by numerous very coarse woodcuts.
199. FLEUTIAUX, ED. Descriptions de nouvelles espèces de *Cicindélides*. C.R. ent. Belg. 1886, pp. lxxxvi-xc. [*Coleoptera*.]
5 species, from several regions.
200. —. Supplément au Catalogue des *Coléoptères* de M. M. Gemminger et de Harold; *Languriides* et *Erotyliides*. Ann. Ent. Belg. xxx, pp. 216-224.
201. FOL, H. L'instinct et l'intelligence. Rev. Sci. 1886 (i), pp. 193-196 & 265-269.
The first part of this is chiefly devoted to Fabre's views as to the psychology of *Hymenoptera*. The author gives definitions of instinct and intelligence.
202. FORBES, S. A. Studies on the Contagious Diseases of Insects. Bull. Illin. Lab. N. H. ii, pp. 257-321, pl.
Gives an account of disease considered to be due to the presence of *Bacillus* or *Micrococcus* in several species of *Lepidoptera*. [Summary in J. R. Micr. Soc. (2) vi, pp. 971 & 972.]
203. FOREL, A. Espèces nouvelles de Fourmis américaines. C.R. ent. Belg. 1886, pp. xxxviii-xlix. [*Hymenoptera*.]
204. —. Diagnoses provisoires de quelques espèces de Fourmis de Madagascar. T. c. pp. ci-cvii. [*Hymenoptera*.]
205. —. Nouvelles *Fourmis* de Grèce. T. c. pp. clix-clxviii. [*Hymenoptera*.]
A list of 41 species, and 15 races or varieties, with three novelties.
206. —. Études myrmécologiques en 1886. Ann. Ent. Belg. xxx, pp. 131-215. [*Hymenoptera*.]
Consists of two parts. I. Observations on habits, &c. II. Descriptions of new or insufficiently known species. He states that when *Formica pratensis* migrates, all its guests and parasites follow it, evidently by the aid of the olfactory function of their antennæ. The sense of smell, he considers, takes a development (capacity of localising an odour) wanting in ourselves.

207. [FOREL, A.] Einige Ameisen aus Itajahy (Brasilien). MT. schw. ent. Ges. vii, pp. 210-217. [*Hymenoptera*.]

208. —. Indian Ants of the Indian Museum, Calcutta. No. 2. J. A. S. B. lv. pp. 239-249. [*Hymenoptera*.]

Several new species, and remarks on others previously known.

209. —. Expériences et remarques critiques sur les sensations des Insectes. Rec. Z. Suisse, iv, pp. 1-50 & 145-240, pl. i.

Pp. 1-29 give a free translation of a memoir published by the author in the MT. Münch. Ent. Ver. 1878, accompanied by some notes relative to recent literature; at p. 30 commences an original memoir, entitled, "Nouvelles et anciennes expériences," relative to the perception of forms and colours. He describes experiments he made with *Bombi* and Wasps, showing that the former are very sensitive to colour, and he considers it certain that Insects perceive more or less distinctly the forms of objects; argues that this is consistent with Exner's accepted views, and criticises Plateau's recent paper on the perception of the forms of objects by Insects. He states that he is still unable to comprehend the functional value of ocelli to those Insects that possess also faceted eyes. At p. 145 he commences an account of a series of experiments directed to ascertaining whether the perception of the ultra-violet rays by Ants, is a function of the eyes, or of the surface of the body, and decides in favour of the eyes. He then discusses the photodermatic, or dermatoptic sense, and gives observations on the faculty of recognition in Ants; and note on the function of the ocelli, and on the instinct of direction. Pp. 182-214 contain a good discussion of the sense of smell, and the function of the antennæ, and detail some observations on Insects whose antennæ had been amputated. He next treats of the sense of taste, and then more briefly on hearing and touch, and ends with some general remarks and considerations on the mental faculties of Insects. [For notice, see J. R. Micr. Soc. 1887, p. 379.]

210. FOWLER, W. W. The *Coleoptera* of the British Islands. A descriptive account of the families, genera, and species indigenous to Great Britain and Ireland, with notes as to localities, habitats, &c. London.

Parts 1-4 have been published in 1886, comprising pp. 1-128, and pls. i-xvi.

211. —. On a small collection of *Languriidæ* from Assam, with descriptions of two new species. Tr. Ent. Soc. 1886, pp. 23-25. [*Coleoptera*.]

212. —. New genera and species of *Languriidæ*. T. c. pp. 303-322, pl. iii. [*Coleoptera*.]

19 new species; several new genera from different regions; also remarks on taxonomic and family characters.

213. —. Descriptions of new species of *Languriidæ*. C.R. ent. Belg. 1886, pp. cvii-cxii. [*Coleoptera*.]

8 species from Philippines and Zanzibar.

214. FRANÇOIS, —. Sur un larve de *Lampyrus noctiluca*, ayant vécu sans tête. C.R. ciii, pp. 437 & 438. [*Coleoptera*.]

215. *FRENCH, G. H. The Butterflies of the Eastern United States. Philadelphia: 402 pp., 93 figs. (cf. Ent. Am. ii, p. 43.)

216. FREY, H. Vierter Nachtrag zur *Lepidopteren*-Fauna der Schweiz. MT. schw. ent. Ges. vii, pp. 256 & 257.

Includes descriptions of 3 new species of *Elachista*.

217. FRIVALDSZKY, J. *Lepidoptera nova et varietates*, in expeditione ad oras Asiæ orientalis, Comitibus Belæ Széchenyi, a dominis Gustavo Kreitner et Ludovici Loczy collecta. Term. füzetek, x, pp. 39 & 40.

2 new species of *Rhopalocera*.

218. —. Difformitates et Monstrositates *Coleopterorum*. T. c. pp. 78–80, pl. iv.

Eight cases: a very remarkable one in *Cerambyx scopolii*, in which the two antennæ are inserted on one side of the head.

219. FUCHS, A. *Microlepidopteren* des unteren Rheingau's. S. E. Z. xlvii, pp. 39–83.

Pp. 39–62 are devoted to an account of collecting in this locality; the other pages are devoted to notices of 24 species; in the case of some species the notes are of local interest only, and these are not alluded to under "Systematic."

220. FUCHS, K. Dr. Karl Müllenhoff's Arbeiten über den Flug der Tiere. Kosmos, xix, pp. 136–144.

Of only secondary entomological importance.

221. GABBI, U. Contribuzione allo studio dei nervi motori e della loro terminazione nei muscoli striati degli *Artropodi*. Bull. Soc. Ent. Ital. xviii, pp. 310–332, pls. xi & xibis.

The greater part of this memoir is devoted to a *resumé* of previous researches as to the terminations of nerves in muscles, and a bibliographical record is given. His own observations related to *Musca vomitoria*, *Libellula* larva, *Silpha obscura*, *Ateuchus sacer*, *Blatta germanica* (and *Geophilus*). [For summary, vide J. R. Micr. Soc. (2) vi, pp. 961 & 962.]

222. GADEAU DE KERVILLE, H. Note sur l'albinisme imparfait unilatéral chez les *Lépidoptères*. Ann. Soc. Ent. Fr. (6) v, pp. 431–434.

Gives a list of 21 species in which he has observed this deficiency of colour, and states that its cause is unknown.

223. —. Évolution et Biologie des *Hypera arundinis*, Payk., et *Hypera adspersa*, Fabr. Ann. Soc. Ent. Fr. (6) vi, pp. 357–362. [*Coleoptera*.]

224. —. Evolution et Biologie des *Bagous binodulus*, Hbst., et *Galerucella nymphaeae*, L. Op. cit. v, pp. 423–430. [*Coleoptera*.]

225. GANGLBAUER, L. Ueber einige von Herrn E. v. Oertzen in Griechenland gesammelte Käfer. S. E. Z. xlvii, pp. 309 & 310. [*Coleoptera*.]

4 new species or varieties.

226. [GANGLBAUER, L.] Eine neue *Anthaxia* der Wiener Gegend, et eine neue *Anthaxia* aus Persien. Deutsche E. Z. xxx, p. 87. [*Coleoptera*.]
227. —. Revision der caucasischen *Plectes*- oder *Tribax*-Arten. T. c. pp. 305–336. [*Coleoptera*.]
 Recognizes 28 species, of which 6 are new ; they are distinguished in a table and by descriptive observations.
228. —. Die Spanish-portugiesischen *Hadrocarabus*. T. c. pp. 373–382. [*Coleoptera*.]
 Recognizes only 2 true species, with numerous varieties.
229. —. Uebersicht der europäisch-mediterranen *Dorcus*-Arten. Soc. Ent. i, pp. 81 & 82. [*Coleoptera*.]
230. —. Ein neuer *Aesalus*. T. c. p. 89. [*Coleoptera*.]
231. —. Turkestanische *Bockkäfer*. Hor. Ent. Ross. xx, pp. 128–130. [*Coleoptera*.]
 2 new species, 1 new genus.
232. —. Die *Bockkäfer* der Halbinsel Korea. T. c. pp. 131–138. [*Coleoptera*.]
 35 species, 6 being new.
233. —. Ein neuer *Pogonocherus* aus dem Kaukasus. T. c. pp. 139 & 140. [*Coleoptera*.]
234. —. Zwei neue *Caraben*. T. c. pp. 268–270. [*Coleoptera*.]
 —. [See also RADDE.]
235. *GÄRTNER, J. B. Illustriertes Bienenbuch. Anleitung zur rationellen Bienenzucht. Trier : 1886, 166 pp. [Cf. Zool. Anz. ix, p. 418.]
236. GASPERINI, R. Notizie sulla fauna imenotterologa Dalmata. I Api e Vespe. Ann. Dalm. iii, pp. 1–30 (separate copy). [*Hymenoptera*.]
 A list of 193 species of Bees and 25 of Wasps.
237. GAZAGNAIRE, J. Note sur un prétendu “nouveau type de tissu élastique” observé par M. H. Viallanes chez la larve de l'*Eristalis*. Bull. Soc. Z. Fr. xi, pp. 583–586.
 The supposed elastic tissue is considered to be really unicellular cutaneous glands.
238. —. Des glandes chez les Insectes. Sur un prétendu “nouveau type de tissu élastique.” C.R. cii, pp. 1501–1503 ; also C.R. Soc. Biol. (8) iii, pp. 312–315.
239. —. Des glandes salivaires dans l'ordre des *Coléopteres*. C.R. cii, pp. 772–774.

He considers that salivary glands are present throughout the order, and that they are either a simple or branched tube in connection with the oesophagus, or are represented by a glandular layer situated in the oesophagus and gizzard. [For summary, vide J. R. Micr. Soc. (2) vi, p. 426.]

240. [GAZAGNAIRE, J.] Du siège de la gustation chez les Insectes *Coléoptères*. *T. c.* pp. 629-632.

He locates the sense of taste in the anterior part of the dorsal wall of the pharynx, and indicates an arrangement of gustatory hairs specially characteristic of *Carabidæ*, *Halophilidæ*, *Dyticidæ*, *Gyrinidæ*, *Hydrophilidæ*. [For summary, see *J. R. Micr. Soc.* (2) vi, p. 425.]

241. GEHUCHTEN, A. VAN. Étude sur la structure intime de la Cellule musculaire striée. *La Cellule*, ii, pp. 289-454, pls. i-vi.

Pp. 318-357 & 397-410 of this memoir are devoted to the muscles of Insects.

242. GERCKE, G. *Dipterologische Miscellaneen*. *Wien. ent. Z.* v, pp. 161-168, pl. ii.

Descriptions of some points of structure of several Flies, and a new *Empis* from Dalmatia.

243. GILSON, G. Étude comparée de la spermatogénèse chez les Arthropodes. *La Cellule*, i, pp. 1-188, pls. i-vii, & ii, pp. 83-239, pls. ix-xv.

The portion of this work in vol. i is chiefly devoted to Insects, and describes and figures the spermatozoa and their development in all the orders of Insects. Vol. ii contains nothing entomological. [For summary, see *J. R. Micr. Soc.* 1887, p. 222.]

244. GIRARD, M. Les Insectes. *Traité élémentaire d'Entomologie*. Vol. III, 1110 pp., 43 pls. Completed.

This completes the work as well as the volume.

245. GIRSCHNER, E. Ueber *Hyalomyia obesa*, F. *Wien. ent. Z.* v, pp. 1-6, 65-70, 103-107, pl. i. [*Diptera*.]

246. *GLASER, L. Die Kleintiere in ihrem Nutzen und Schaden für die Haus-, Land-, Garten-, und Forstwirtschaft. Magdeburg: 1886.

. This introductory work is largely entomological, and is noticed at length by Schlechtendal, *Z. Naturw.* lix, pp. 287-293.

247. GODMAN, F. D., & SALVIN, O. *Biologia Centrali-Americana*. Parts xlv-lviii. London.

The following shows the progress made during the year with the *Insecta* :—

Lep. Rhopalocera, by Godman & Salvin, vol. i, pp. 401-487, pls. xlii-xlvii, temporary title-page : *Erycinidæ* completed.

Lep. Heterocera, by Druce, pp. 161-200, pls. xv-xx, *Diopitidæ-Lasiocampidæ*.

Col., vol. i, pt. 2, by Sharp, pp. 537-672, pls. xiv-xvi, *Staphylinidæ*, as far as *Megalops*.

Col., vol. ii, pt. 2, by Bates, pp. 1-24, pl. i, *Pectinicornia*.

Col., vol. iii, pt. 2, by H. S. Gorham, pp. 313-372, & xii, pl. xiii, *Malcodermata* completed.

Col., vol. iv, pt. 1, by G. C. Champion, pp. 137-264, pls. vii-x, *Heteromera*, from *Crypticides* to *Misolampides*.

- Col.*, vol. v, by Bates, *Longicornia*, index and introduction, completing the vol.
Col., vol. vi, pt. 1, by M. Jacoby, pp. 409-496, pls. xxiii-xxvii, *Halticidæ* completed, *Galerucidæ* commenced.
Col., vol. vi, pt. 2, by J. S. Baly, pp. 73-124, pl. iv, *Hispidæ* completed.
Hymenoptera, by P. Cameron, pp. 241-328, pls. xii & xiii, completes *Ichneumonidæ* and commences *Bracon*.
Diptera, by O. R. Osten-Sacken, pp. 128, pls. i & ii, as far as *Anthrax*.

The vol. of this work completed by Bates last year, as well as that by Gorham here recorded, are reviewed in *Nature*, xxxiii, pp. 333 & 334, by Wallace.

248. GÖLDI, E. A. Die Eier zweier brasilianischen Gespenstheuschrecken. Zool. JB. i, pp. 724-729, 4 figs. [*Orthoptera*.]

These eggs (of *Phasmatidæ*) resemble some common brasilian seeds, thus deceiving, so he believes, the *Ichneumonidæ*; these latter being, he states, of extreme importance in the entomology of the tropics.

249. —. Beiträge zur Kenntniss des kleinen und kleinsten Gliederthierwelt Brasiliens. MT. schw. ent. Ges. vii, pp. 231-255. [*Rhynchota*.]

I Eine brasilianische Buckelwanze aus der Gattung *Tingis*, Fab.
 II Neue brasilianische *Aleurodes*-Arten. III *Dorthisia*. Some new species are described and anatomical details as to the sexual and some other structures given, and the occurrence of the European *Dorthisia urticae* on various plants in S. America recorded.

250. GOOSSENS, TH. Des chenilles vésicantes. Ann. Soc. Ent. Fr. (6) vi, pp. 461-464.

By the use of alcohol, a fatty substance with strong vesicating properties was obtained from the larvæ of *Cnethocampa processionæ*.

251. GORHAM, H. S. On new Genera and Species of *Endomychidæ*. P. Z. S. 1886, pp. 154-163, pl. xvii. [*Coleoptera*.]

3 new genera and 14 new species from various geographical regions.

— [See also GODMAN & SALVIN.]

252. GOZIS, DES. Recherche de l'espèce typique de quelques anciens genres, rectifications synonymiques, et notes diverses. Paris: 1886, 8vo, 36 pp. [*Coleoptera*.]

In this work the author, inverting the usual practice of zoologists, treats the names as primary objects, and the Insects as of secondary importance. In considering an old author, he treats the species placed by him as the first of the genus as being its "type," and then alters the application of many of our commonest generic names—such as *Melolontha* and *Carabus*—in accordance with this assumption. [Cf. Perrin (549), Sharp (659), de Borre (C.R. ent. Belg. xxx, p. cc).]

253. GRABER, V. Neue Versuche über die Funktion der Insektenfühler. Biol. Centralbl. vii, pp. 13-21.

Discusses Plateau's experiments (C.R. Ent. Belg.) and also details observations, from which he concludes that Cockroaches deprived of their antennæ perceive odours but little or not at all.

254. GRAELLS, M. DE LA PAZ. Entomologia judicial. Rev. prog. ci, xxi, pp. 458-471.

An article on recent cases of entomology used for purposes of jurisprudence.

- X 255. GRANDIDIER, A. Histoire physique, naturelle et politique, de Madagascar, publiée par Alfred Grandidier. Vol. xix. Histoire Naturelle des Lépidoptères. Tome ii. Atlas. 1^{re} partie sous la direction d'Alfred Grandidier et Paul Mabille. Paris: 1885.

This atlas is composed of 55 coloured plates. As no corresponding letterpress has been received, notice of the figures must be delayed.

256. GRASSI, B. I progenitori degli Insetti e dei Miriapodi. II L'Japyx e la Campodea. Atti Acc. Gioen. xix, pp. 1-83, pls. i-v.

Discusses the presumed species of both *Japyx* and *Campodea*, and gives anatomical details, and in a third part considers the affinities. The first memoir of the series relates to *Myriapoda*. [For brief summary, see J. R. Micr. Soc. 1887, p. 75.]

257. —. I progenitori dei Miriapodi e degli Insetti. III. Contribuzione allo studio dell Anatomia del genere *Machilis*. T. c. pp. 101-128, pl. unnumbered.

He considers that Mayr's theory that *Machilis* is the nearest approach to the original progenitor of Insects may "not be destitute of all foundation," and that *Machilis* should form a distinct family.

258. —. I progenitori dei Miriapodi e degli Insetti. Mem. iv. Cenni anatomici sul genere *Nicoletia*. Bull. Soc. Ent. Ital. xviii, pp. 173-182, pls. vii & viii.

Brief anatomical and systematic details under the following headings: 1, cuticula; 2, nervous system; 3, organs of sense; 4, tracheal system; 5, alimentary canal; 6, dorsal vessel; 7, genital organs; 8, segments and appendages of the body; general considerations.

259. —. Sur le développement de l'abeille dans l'œuf. Arch. Ital. Biol. vii, pp. 242-273.

A translation of the memoir recorded last year. The abstract given in Biol. Centralbl. of the original paper is translated in Am. Nat. xx, pp. 462-464, and an elaborate summary is given in J. R. Micr. Soc. (2) vi, pp. 783-787.

260. GROTE, A. R. A List of the North American *Sphingidæ*. Canad. Ent. xviii, pp. 126-136. [*Lepidoptera*.]
97 species.

261. —. On the Geographical Distribution of N. American *Lepidoptera*. T. c. pp. 162, 197, 213, 230.

262. GUEST, E. Remarks on the nomenclature of some of the South Australian Butterflies, with observations. Tr. R. Soc. S. Austr. viii, pp. 60-62. [*Lepidoptera*.]

Of local interest only ; but he says that it is " quite a mistake to suppose that Butterflies and Moths are scarce in S. Australia."

263. GUILLEMARD, F. H. H. The Cruise of the 'Marchesa' to Kam-schatka and New Guinea. Vol. II, Appendix iii, pp. 374-377. List of *Rhopalocera* collected in the Eastern Archipelago by O. Janson.

This includes 93 species, 3 being new ; a new variety and a doubtful *Euplaea* are also described. The body of the work contains references to the capture of some of the larger Butterflies and other Insects.

264. HAACKE, W. Ueber die geologische Thätigkeit der Ameisen. Zool. Gart. xxvii, pp. 373-375.

265. HAAR, D. TER. Lijst van planten waarop de in Nederland voorkomende *Microlepidoptera* te vinden zijn. Tijdschr. Ent. xxix, pp. 159-223.

266. HAASE, E. Duftapparate bei Schmetterlingen. SB. Ges. Isis, 1886, pp. 9 & 10. [*Lepidoptera*.]

A proposed classification of the scent-organs of *Lepidoptera* in accordance with their being, A, peculiar to one sex ; B, common to both sexes. [For summary, vide J. R. Micr. Soc. (2) vi, pp. 969 & 970.]

267. —. Die Vorfahren der Insecten. T. c. pp. 85-91.

A *resumé* of the considerations employed by Brauer in his derivation of *Insecta* and their progenitors from the *Chilopoda* and *Campodea*.

268. —. Zwei interessante Zwitter. CB. Iris, pp. 36-39, figs. [*Lepidoptera*.]

Hermaphrodites of *Danaïs ismare*, Cr., and *Lycena escheri*, Hb.

269. —. Duftapparate indo-australischer Schmetterlinge. I. *Rhopalocera*. T. c. pp. 92-107, pl. iii, part.

Describes the scent-organs of the males of butterflies of several families.

270. —. Ein neuer *Phengodes*. Ent. Nachr. xii, p. 218. [*Coleoptera*.]

Describes the larva-like female.

271. HAGEN, H. A. Kurze Bemerkungen ueber das Flügelgeäder der Insecten. Wien. ent. Z. v, pp. 311 & 312.

Describes his method of separating the upper and lower membranes from one another.

272. —. Monograph of the *Hemerobidæ*. Part I, *Nemopteridæ*. P. Bost. Soc. xxiii, pp. 250-269. [*Neuroptera*.]

Recognizes 26 species as probably genuine, and gives remarks on those known to him ; 1 being treated as new.

273. —. On *Hemerobius dipterus*, Burm., and *H. delicatulus*, Fitch. Ent. Am. ii, pp. 21-24. [*Neuroptera*.]

274. HALLEZ, P. Loi de l'orientation de l'embryon chez les Insectes. C.R. ciii, pp. 606-608.

Relates specially to *Locusta viridissima* and *Hydrophilus piceus*. (Summary J. R. Micr. Soc. 1887, p. 72.)

275. HAMILTON, A. Notes on the so-called "Vegetable Caterpillar" of New Zealand. Tr. N. Z. Inst. xviii, pp. 209-213.

276. HARKER, A. H. On the Probable Early Extinction of a Cotteswold Butterfly. P. Cottesw. Nat. F. C. viii, pp. 73 & 74, plate unnumbered.

Refers to *Lycæna arion*.

277. HAROLD, E. VON. Coprophage *Lamellicornien* beschrieben. B. E. Z. xxx, pp. 141-149.

This, the last entomological work of its regretted author, gives descriptions of 9 new species from various localities.

278. HAURY, CH. Description d'une nouvelle espèce de *Carabus*. Le Nat. viii, p. 215. [*Coleoptera*.]

279. —. Diagnose d'un nouveau *Carabe* de l'Amour. T. c. p. 269. [*Coleoptera*.]

280. HEIDER, K. Ueber die Anlage der Keimblätter von *Hydrophilus piceus*. Abh. Ak. Berl. 1885, pp. 1-47, sep. pag., pls. i & ii.

In addition to the point indicated by the title, the memoir contains other matter of interest: *e.g.*, not only on the first abdominal segment, but also on all the others, the commencement of rudiments of extremities can be detected; Hatschek's views as to the formation of the nervous system are confirmed; the Malpighian vessels take origin from the ectoderm as outgrowths of the hind gut. [For detailed summary, *vide* J. R. Micr. Soc. (2) vi, pp. 591-593.]

281. HEINEMANN, C. Zur Anatomie und Physiologie der Leuchtorgane mexikanischer Cucuyo's. Arch. mikr. Anat. xxvii, pp. 296-382.

He is now acquainted with five species of *Pyrophorus* occurring near Vera Cruz, but does not state their names, or to which of them his observations relate. He discusses the position and structure of the light organs, means by which the light is influenced, and the nature of the light. [For summaries, *vide* J. R. Micr. Soc. (2) vi, pp. 787-789, and Am. Nat. xx, pp. 808-810.]

HELLINS. [See BUCKLER.]

282. HELM, O. Mittheilungen über Bernstein. XIII. Ueber die Insecten des Bernsteins. Schr. Ges. Danz. (2) vi, pp. 267-279.

Miscellaneous remarks about insects preserved in amber; he has 600 specimens of *Coleoptera* so preserved, in his own collection. The remarks on the *Hymenoptera* are by Brischke.

283. HENNESSY, H. On the Geometrical Construction of the Cell of the Honeybee. P. R. Soc. xxxix, pp. 253 & 254.

284. *HENSEL, J. Das Leben. Seine Grundlagen und die Mittel zu seiner Erhaltung. I. Die Fortdauer der Urzeugung. Physikalisch erklärt zum praktischen Nutzen für Ackerbau, Forstwirtschaft, Heilkunde und allgemeine Wohlfahrt, nebst einer Beilage "Theorie der Lebens-Chemie in Figuren." Christiana: 1885, 512 pp. (cf. Ent. Nachr. xii, pp. 205-208).

Appears to be largely, if not entirely, entomological.

285. *HESS, W. Die Feinde der Biene im Thier- und Pflanzenreiche. Mit 38 Abbildungen auf 32 Holzstocken. Hanover: 106 pp. [*Hymenoptera*.] [Cf. Wien. ent. Z. v, p. 333, & Zool. Anz. ix, p. 655.]

286. HEYDEN, L., & KRAATZ, G. Beiträge zur *Coleopteren*-Fauna von Turkestan, namentlich des Alai-Gebirges, unter Beihülfe der Herren Candèze, Ganglbauer, Stierlin, und Weise. Deutsche E. Z. xxx, pp. 177-194.

An account of a small collection, and descriptions of numerous new species.

287. HEYDEN, L. VON. Die *Coleopteren*-Fauna des Suyfun-Flusses. *T. c.* pp. 269-277.

An account of a small collection, with descriptions of a few new species.

288. —. Neue Käfer-Arten aus Malatia (im südlichen Kleinasien). *T. c.* pp. 278-280. [*Coleoptera*.]

5 species of various families.

289. —. Beiträge zur *Coleopteren*-Fauna von Peking in Nord-China. *T. c.* pp. 281-292.

An account of a small collection received in 1886, with descriptions of 6 new *Lamellicorns*. He considers that the fauna is more like that of Japan than that of the Amur river.

290. —. Zusammenstellung der von Herrn Dr. med. W. Kobelt von seiner Reise in den Provinzen Alger and Constantine sowie von Tunis mitgebrachten *Coleopteren*. Ber. senck. Ges. 1886, pp. 35-37.

A list of about 400 species, 1 being new.

291. HEYLAERTS, F. J. M. Une *Psychide* nouvelle de Java. C.R. ent. Belg. 1886, p. xiv. [*Lepidoptera*.]

292. —. Quatre *Psychides* nouvelles de l'île de Sumatra. *T. c.* pp. clxxii & clxxiii. [*Lepidoptera*.]

3 species only.

293. HOFFER, EDUARD. Wunderbares Erinnerungsvermögen der Hummeln. Ein Beitrag zur Tierpsychologie. Kosmos, xviii, pp. 111-115. [*Hymenoptera*.]

Circumstances such as the appearance of *Bombi* in the spring, at a spot where specimens had been reared in the previous autumn, are narrated.

294. [HOFFER, EDUARD.] Zur Biologie der *Mutilla europæa*, L. Zool. Jahrb. i, pp. 679-686. [*Hymenoptera*.]

Some particulars as to the habits of the insect, the species of *Bombus* in whose nests it occurs, &c.

295. HOFFMANN, A. Einiges über Form und Farbenschutz in Anwendung auf *Culocampa solidaginis*. S. E. Z. xlvii, pp. 161-166. [*Lepidoptera*.]

Relates how this Moth is protected by its resemblance to a dead sprig; and states that it chooses for its resting-place the spots most suitable for the purpose of deception. He also relates how he discovered larva of *Bombyx cratægi* by following an *Ichneumon*.

296. HOLLAND, W. J. Contributions to a knowledge of the *Lepidoptera* of West Africa. Tr. Am. Ent. Soc. xiii, pp. 325-332, pls. viii & ix.

This is the first of a proposed series of papers on this subject, and includes 6 species, 3 considered new; uncoloured figures are given.

297. —. Some notes upon the *Sphingidæ* of the United States. Canad. Ent. xviii, pp. 101-105. [*Lepidoptera*.]

298. HOLMBERG, E. L. *Insectos. Hymenoptera*. Act. Ac. Cordob. v (1884 & 1885), pp. 117-184.

This is part of an account of the zoological results of Dr. Holmberg's journeys to the Sierras de Tandil and la Tinta; the whole of vol. v is to be devoted to this account, but no general title has yet appeared. The portions now before us deal only with a part of *Apidæ*, of which new genera and many new species are described. The locality appears to be near Bahía Blanca. Plates are referred to in the text, but I have not yet seen them.

299. —. Sobre *Apidos Nómadas* de la Republica Argentina. An. Soc. Arg. xxii, pp. 231-240 & 272-286. [*Hymenoptera*.]

Most of the genera and species in this memoir are new. It is not yet completed.

300. HOLMGREN, A. E. Några anteckningar om Parasitstekel-familjen *Cryptidæ*. Ent. Tidskr. 1886, pp. 17-29. [*Hymenoptera*.]

301. —. Öfversigt och utredning af arterna til Pisori-gruppen inom parasitstekel-slågtet *Ichneumon*, L. T. c. pp. 41-44. [*Hymenoptera*.]
1 new species, hitherto confounded with *I. coqueberti*, Wesm.

302. HONRATH, E. Neue *Rhopalocera*. B. E. Z. xxx, pp. 129-131, pl. v.
3 species.

303. —. Neue *Rhopalocera*. v. T. c. pp. 294-296, pl. vi.
2 new species and 2 new varieties from Celebes.

304. —. Eine neue *Morphine* aus Celebes. CB. Iris, p. 91. [*Lepidoptera*.]

305. HORN, G. H. *Dinapate wrightii* and its larva. Tr. Am. Ent. Soc. xiii, pp. 1-5, pl. i. [*Coleoptera*.]

A gigantic new Bostrichid, attaining nearly two inches in length.

306. [HORN, G. H.] A Monograph of the subfamilies *Eucneminae*, *Cerophytinae*, and *Perothopinae* inhabiting the United States. *T. c.* pp. 5-58. [*Coleoptera*.]

59 species are included. Excellent descriptions are given of all the genera and species.

307. —. A Monograph of the species of *Chrysobothris* inhabiting the United States. *T. c.* pp. 65-124, pls. ii-vii. [*Coleoptera*.]

This includes no less than 50 species, many new. The descriptions are very full, and are carefully drawn up, great attention being given to the sexual distinctions. These he considers of great importance; the six plates are full of details of the most useful nature. The synonymy is given separately, pp. 119-121, and this I have not reproduced.

308. HORVATH, G. Nouvelle révision du genre *Plinthisus*. *Rev. d'Ent.* v, pp. 215-222. [*Rhynchota*.]

309. HOWARD, L. O. A generic synopsis of the *Hymenopterous* Family *Proctotrupidae*. *Tr. Am. Ent. Soc.* xiii, pp. 169-178.

310. —. A generic synopsis of the *Hymenopterous* Family *Chalcididae*. *Ent. Am.* i, pp. 197-219, ii, pp. 33-38, 97-101.

311. *HUBER, L. Die neue, nützlichste Bienenzucht oder der Dzierzonsstock, &c. 9 Aufl. Lahr, Schauenburg: 1886, 8vo, viii, 279 pp. [*Cf. Zool. Anz.* ix, p. 154.]

312. HUDSON, G. V. On the metamorphosis of the Caddis Fly. *Tr. N. Z. Inst.* xviii, pp. 213 & 214, pl. ix. [*Neuroptera*.]

A New Zealand species constructing a peculiar case; its name is not given.

313. HULST, G. D. Descriptions of new *Pyralidae*. *Tr. Am. Ent. Soc.* xiii, pp. 145-168. [*Lepidoptera*.]

89 new species.

314. —. New species and varieties of *Geometridae*. *Ent. Am.* i, pp. 201-208. [*Lepidoptera*.]

22 new species.

315. —. Notes on some species of *Geometridae*. No. 2. (*Geometrinae*.) *Op. cit.* ii, pp. 139-142. [*Lepidoptera*.]

316. —. Notes upon various species of the *Ennominae*. *T. c.* pp. 47-52. [*Lepidoptera*.]

This and the following consist of synonymical suggestions and varietal remarks on N. American species.

317. —. New species of *Geometridae*. No. 2. *T. c.* pp. 120-123. [*Lepidoptera*.]

N. American, 13 species.

318. —. Three new varieties and one new species of *Lepidoptera*. *T. c.* p. 182.

319. —. New species of *Geometridae*. No. 3. *T. c.* pp. 185-192. [*Lepidoptera*.]

31 species, in addition to several varieties.

320. HUTH, E. Ameisen als Pflanzenschutz. MT. Ver. Frankfurt-a-O. iv, pp. 101, 138, 171.

Chiefly occupied by a list of "Ant-plants."

321. —. Myrmekophile und myrmekophobe Pflanzen. *T. c.* pp. 317-337.

322. INCHBALD, P., & MEADE, R. H. A new *Cecid.* Ent. xix, pp. 152-154. [*Diptera.*]

323. JACOBY, M. Descriptions of the Phytophagous *Coleoptera* of Japan obtained by Mr. George Lewis during his second journey, from February, 1880 to September, 1881. Part II *Halticinae* and *Galerucinae*. P. Z. S. 1885, pp. 719-755, pl. xlv.

In addition to the description of a new genus and 58 new species, the author gives a complete list of the Japanese Phytophagous *Coleoptera* of all groups. Although this now amounts to 76 genera and 273 species, he expects there are still many additions to be made to it.

324. —. Descriptions of some new species and a new genus of Phytophagous *Coleoptera*. *T. c.* pp. 925-929.

8 species from various geographical regions.

325. —. Beschreibung einer neuen *Ædionychis*-Art von der Insel Creta. S. E. Z. xlvii, pp. 215 & 216. [*Coleoptera.*]

326. —. Descriptions of new genera and species of Phytophagous *Coleoptera* from the Indo-Malayan and Austro-Malayan subregions, contained in the Genoa Civic Museum. Ann. Mus. Genov. (2) iv, pp. 41-121.

This third part is occupied with the *Galerucinae*, and includes about 100 new species and several new genera; several of them are from North Australia, and one or two from Ceylon.

327. —. Descriptions of some undescribed species of Phytophagous *Coleoptera* from Abyssinia, contained in the Genoa Civic Museum. *T. c.* pp. 122-128.

8 new species.

— [See also GODMAN & SALVIN.]

328. JACQUET, E. Note sur le *Montandonia catopoides*, nouveau genre appartenant à la famille des *Dermestidae*. Ann. Soc. L. Lyon. xxxii, pp. 319-321, woodcut. [*Coleoptera.*]

329. JAKOWLEFF, B. Descriptions d'espèces nouvelles ou peu connues du genre *Sphenoptera*, Sol., des régions paléarctiques. Hor. Ent. Ross. xx, pp. 82-103. [*Coleoptera.*]

330. JAKOWLEW, A. Quelques matériaux pour servir à la connaissance de la distribution géographique des mouches à scie (*Tenthredinidae*) en Russie. Hor. Ent. Ross. xx, pp. 236-241. [*Hymenoptera.*]

Includes 1 new *Sciapteryx*.

JANSON, O. [See GUILLEMARD.]

331. JAWOROWSKI, A. *Vanessa urticae* 113 dni bez glowy. Kosmos, Lemberg, 1886, pp. 244-259.

Entirely in Polish.

332. *JENYNS, F. G. A book about Bees: their History, Habits, and Instincts: together with the first principles of modern Bee-Keeping for young readers. With introduction by the Baroness Burdett-Coutts. Published at the request and under the sanction of the British Bee-Keepers' Association. London: Gardner, 1886, 210 pp.

333. JHERING, H. VON. Der Stachel der Meliponen. Ent. Nachr. xii, pp. 177-188, pl.

Discusses the imperfect sting of *Melipona* and *Trigona*. The parts forming the sting are developed from the twelfth and thirteenth segments, and the copulatory apparatus from the twelfth. A considerable part of the memoir is devoted to the position of the stigmata, and the probability of their transference from one segment to another. The plate I have not seen.

334. JORDAN, K. Die Schmetterlingsfauna Nordwest-Deutschlands, insbesondere die *Lepidopterologischen* Verhältnisse der Umgebung von Göttingen, pp. xviii & 164. Jena: published as a supplement heft to Zool. Jahrb. i.

This work contains a large quantity of information, in addition to the Catalogue of the Göttingen species, and discusses several questions of general interest. *E.g.*, division of the Lepidopterous fauna in accordance with the nature of the vegetation; dependence of the distribution on that of the vegetation; the occurrence in different seasons of the year. The catalogue itself occupies only about one-half of the volume, but is arranged so as to give a great deal of details. It includes all the families of *Lepidoptera*. [Noticed, Ent. Nachr. xii, p. 319.]

335. KARSCH, F. Ueber das *Dipterengenus Dolichocheza*, Curt. B. E. Z. xxx, pp. 63 & 64.

Description of a new species from Madagascar.

336. —. Ueber die *Dipterengattung Laparus*. T. c. pp. 71 & 72.

Descriptions of 2 new species from Africa.

337. —. Ueber einige neue oder wenig bekannte Oehrwürmer (*Dermoptera*) der äthiopischen Region. T. c. pp. 85-91, pl. iii.

338. —. *Orthopterologische* Beiträge. 1. Die *Mecopodiden* des Berliner Zoologischen Museums. T. c. pp. 107-118, pl. iv.

2 new subgenera of *Mecopoda*, and 4 new species from Africa and Ceylon.

339. —. Beitrag zur Kenntniss der *Dipterengruppe Actiadae*, Bigot. T. c. pp. 135-137.

A new genus and species from Central Africa.

340. —. *Dipteren* von Pungo-Andongo gesammelt von Herrn Major A. von Homeyer. Ent. Nachr. xii, pp. 49-58, 257-264, & 337-342.

The collection consisted of 56 species, of which a large proportion are new; another instalment will complete the memoir.

341. [KARSCH, F.] Eine neue westafrikanische *Mekopode*. *T. c.* pp. 316-318. [*Orthoptera*.]
342. —. Ueber eine neue, Höhlen bewohnende *Orthoptère* Amboina's. *T. c.* pp. 344-346.
343. KELLICOTT, D. S. *Nonagria subcarneu*, n. sp. Bull. Buff. Soc. v, pp. 40-44. [*Lepidoptera*.]
344. —. *Hydreomena traversata*, n. sp. *T. c.* pp. 45 & 46. [*Lepidoptera*.]
345. *KESSLER, H. F. Notizen zur Lebensgeschichte der Rosenblattlaus, *Aphis rosæ*, L. Kassel. 1886, pp. 11. [Cf. Zool. Anz. ix, p. 646.]
346. KERREMANS, CH. *Buprestides* nouveaux et remarques synonymiques. Fasc. I. *Julodides*. C.R. ent. Belg. 1886, pp. xxxiii-xxxviii. [*Coleoptera*.]
- He considers that far too many species have been made in this group.
347. —. Deux *Sternocera* nouveaux de la région du lac Tanganyka. *T. c.* p. xviii. [*Coleoptera*.]
348. —. Description d'une espèce et variété nouvelle du genre *Sternocera*. Notes Leyd. Mus. viii, p. 189. [*Coleoptera*.]
349. KIEFFER, J. J. Beschreibung neuer Gallmücken und ihrer Gallen. Z. Naturw. lix, pp. 324-333. [*Diptera*.]
- 5 new species of *Cecidomyia* found near Bitsch in Germany.
350. KIRBY, W. F. Remarks on Four Rare Species of Moths of the Family *Sphingidae*. P. Z. S. 1886, pp. 269-271, pl. xxvii. [*Lepidoptera*.]
351. —. On a Small Collection of Dragon Flies from N.-W. India, received from Major J. W. Yerbury. *T. c.* pp. 325-329, pl. xxxiii. [*Neuroptera*.]
- 19 species enumerated, 4 of them new.
352. —. A Synopsis of the Genera of the *Chalcididae*, Subfamily *Eucharinae*, with Descriptions of Several New Genera and Species of *Chalcididae* and *Tenthredinidae*. J. L. S. xx, pp. 28-37, pl. i. [*Hymenoptera*.]
- Recognizes 15 genera, 5 of which are established each for a single type of Walker's; in addition, 8 species of *Chalcididae*, 3 of *Tenthredinidae*, are described.
353. —. Description of a New Species of Saw-fly from Albania. Ann. N. H. (5) xviii, p. 497. [*Hymenoptera*.]
354. KIRSCH, T. Neue südamerikanische Käfer. B. E. Z. xxx, pp. 331-340. [*Coleoptera*.]
- 16 species from Colombia, Bolivia, and Ecuador.
355. KNATZ, L. Verwandtschaft und relatives Alter der *Noctuæ* und *Geometræ*. Zool. Anz. ix, pp. 610-612. [*Lepidoptera*.]
- Relates chiefly to the number and peculiarities of the false feet in some *Noctuæ*. [For brief summary, vide J. R. Micr. Soc. 1887, p. 75.]

356. KNÜPPEL, A. Ueber Speicheldrüsen von Insecten. Arch. f. Nat. lii, 1, pp. 269-303, pls. xiii & xiv.

Particulars as to the salivary glands of many species, especially *Diptera*.

357. KOCH, F. W. Der Heu- und Sauerwurm oder der einbindige Traubenwickler (*Tortrix ambiguella*) und dessen bekämpfung. Mit 23 abbild. auf 2 lith. Taf. 31 pp. [Cf. Zool. Anz. ix, p. 417.]

358. KOHL, F. F. Neue *Pompiliden* in den Sammlungen des K. K. naturhistorischen Hofmuseums. Verh. z.-b. Wien, pp. 307-346, pls. x & xi. [*Hymenoptera*.]

In addition to describing 40 new species, he gives a simplified tabulation of the groups of *Pompilus*. The two plates give views of the head, and some wings.

359. KOLBE, H. J. Ueber die Stellung von *Platypsyllus* in System. B. E. Z. xxx, pp. 103-105.

He appears to consider it doubtful whether *Platypsyllus* is really *Coleopterous*; and says, "It looks as if *Platypsyllus* bears the same relation to *Mallophaga* as *Polyctenidae* does to the *Pediculidae*."

360. —. Beiträge zur Kenntniss der *Coleopteren*-Fauna Koreas, bearbeitet auf Grund der von Herrn Dr. C. Gottsche während der Jahre 1883 und 1884 in Korea veranstalteten Sammlung; nebst Bemerkungen über die zoo-geographischen Verhältnisse dieses Faunengebietes und Untersuchungen über einen Sinnes-apparat im Gaumen von *Misolampidius morio*. Arch. f. Nat. lii, 1, pp. 139-240, pls. x & xi.

The collection was obtained during eight months of travel. The country is considered to be unfavourable for insect life; 142 species of *Coleoptera* were obtained, of these 30 are new, more than one half are Japanese species, and only 15 are European. The memoir contains many observations on the distribution.

361. —. Tabellarische Uebersicht von 16 *Tefflus*-Arten (2 n. spp.) Ent. Nachr. xii, pp. 225-229. [*Coleoptera*.]

362. —. Neue afrikanische *Coleoptera* des Berliner zoologischen Museums. T. c. pp. 289-301.

14 species *Tenebrionidae* and *Mylabridae*, 2 new genera.

363. KONOW, F. W. Bemerkungen über *Blattwespen*. Deutsche e. Z. xxx, pp. 73-82. [*Hymenoptera*.]

Chiefly synonymical, but describes 2 or 3 new species.

364. —. Sieben neue *Allantus*-Arten. Wien. ent. Z. v, pp. 17-21. [*Hymenoptera*.]

365. —. Ueber mehrere neue und einige schon bekannte *Blattwespen*. T. c. pp. 37-41. [*Hymenoptera*.]

Deals with *Amasis*, *Tenthredo*, and *Allantus*. Most of the 6 new species are from the Caucasus.

366. —. Ueber einige *Blattwespen*. T. c. p. 107. [*Hymenoptera*.]

367. [KONOW, F. W.] Die europäischen *Blennocampen* (soweit dieselben bisher bekannt sind). *T. c.* p. 183, 211, 243, 267. [*Hymenoptera.*]

The genera are tabulated and described, 13—6 of them new—being recognized. The species are discriminated by tables.

368. —. Description d'une espèce nouvelle de *Tenthrede*. *Rev. d'Ent.* v, p. 137. [*Hymenoptera.*]

369. KORSCHULT, E. Ueber die Entstehung und Bedeutung der verschiedenen Zellen-elemente des Insektenovariums. *Z. wiss. Zool.* xliii, pp. 537—720, pls. xx—xxiv.

This gives a large amount of information about the growth and development of the various kinds of cells found in the ovaries of Insects. He commences with a sketch of the three principal kinds of these organs, and then passes to a historical review of the subject, dealing specially with the terminal threads and the terminal chamber. In a second part he details his own observations made on 14 species of Insects of several orders, discussing very fully—under *Notonecta glauca*—Will's observations and conclusions. In part III he generalises his observations, and compares them with those of others. Discusses also the numerous differences in the earlier stages of the various cell-elements, and whether they can be reduced to a common type, as also the bearing of his observations on Weismann's theory of the continuity of the germ plasma; then passes to the similarity in the formation of the egg in Insects and in *Daphnidæ*. iv. Treats of the importance of the terminal thread and terminal chamber in the formation of the various cell-elements. v. The morphological importance of the various cell-elements of the ovarian tubes. vi. Critical remarks on previous investigations, concluding with a summary of his results under twelve heads, the first being that the different cell-elements of the egg-tubes, eggs, nutrient cells, and epithelium arise out of homologous neutral elements, which are to be looked for in the contents of the egg-tube at its earliest foundation. [Brief summary, *J. R. Micr. Soc.* (2) vi, p. 782, and 1887, pp. 71 & 72.]

370. —. Ein weiterer Beitrag zur Lösung der Frage nach dem Ursprung der verschiedenen Zellenelemente der Insectenovarien. *Zool. Anz.* ix. pp. 256—263.

A continuation of the discussion between the writer, Will, and Wielowiejski [cf. *Zool. Rec.* xxii, *Ins.* (172)] of some obscure points in the earlier stages of the formation of the egg in the ovary.

371. KOWALEVSKY, A. Zur embryonalen Entwicklung der *Musciden*. *Biol. Centralbl.* vi, pp. 49—54. [For summary, vide *J. R. Micr. Soc.* (2) vi, pp. 429 & 430.]

372. —. Zum Verhalten des Rückengefäßes und des guirlanden-förmigen Zellenstrangs der *Musciden* während der Metamorphose. *T. c.* pp. 74—79.

He finds that the middle portion of the heart and the surrounding masses of cells persist from the youngest larva to the imago, and that its function is in a certain degree uninterrupted. For summary, vide *J. R. Micr. Soc.* (2) vi, pp. 593 & 594.]

373. KRAATZ, G. *Coptolabrus constricticollis*, n. sp., vom Suyfun. Deutsche e. Z. xxx, pp. 241-242, pl. [Coleoptera.]

This is accompanied by a photographic plate of Asiatic *Carabi*.

374. —. Ueber eine Caraben-Sendung von der Suyfun-Mündung vom Amur. T. c. pp. 257-268. [Coleoptera.]

12 species and a large number of varieties are commented on.

375. —. Eine neue griechische Laufkäfer Gattung. T. c. p. 431. [Coleoptera.]

376. —. Ueber *Simorrhina staudingeri* und einige andere *Cetoniden* von Benue. T. c. pp. 438-444. [Coleoptera.]

377. —. Ueber *Cetonien* aus Turkestan. Hor. Ent. Ross. xx, pp. 104-110. [Coleoptera.]

Notes on 6 species with 2 new varieties.

— [See also RADDE.]

— [See also HEYDEN and KRAATZ.]

378. *KRASSILTSCHIK, J. De insectorum morbis, qui fungis parasitis efficiuntur. (Gr. 8vo, 97 pp. Aus dem xi Band der Annal. der Neurussisch. Ges. der Naturforscher. Odessa : 1886.)

In Russian. [Cf. Wien. ent. Z. v, p. 204.]

379. KRAUSS, H. Beiträge zur Orthopteren-Kunde. Verh. z.-b. Wien, xxxvi, pp. 137-148, pl. v.

Relates to some European species of *Forficulidæ*, *Gryllidæ*, and *Acrydiidæ*.

380. KRIECHBAUMER, —. Neue Schlupfwespen. Ent. Nachr. xii, pp. 241-246. [Hymenoptera.]

5 species and a new genus ; European.

381. KUBLI, —, & REBER, —. Beitrag zur Arbeitsleistung und Entwicklung der Bienenvölker. Ber. St. Gall. Ges. 1884-85, pp. 210-272.

382. KÜNCKEL, J. La Punaise de lit et ses appareils odoriférants.—Des glandes abdominales dorsales de la larve et de la nymphe ; des glandes thoraciques sternales de l'adulte. C.R. ciii, pp. 81-83. [For summary, vide J. R. Micr. Soc. (2) vi, p. 790 ; translation, Ann. N. H. (5) xviii, pp. 167 & 168.]

383. —. La Punaise de lit et ses appareils odoriférants.—Changement de situation et de forme de ces appareils aux différents ages de l'insecte. C.R. Soc. Biol. (8) iii, pp. 375-377.

384. KUWERT, A. Beiträge zur Kenntniss der *Helophoren* aus Europa und den angrenzenden Ländern. Wien. ent. Z. v, pp. 90-92, 135-139, & 169. [Coleoptera.]

A continuation (cf. Zool. Rec. xxii, Ins. p. 64).

385. LAFAURY, C. Descriptions de chenilles de *Microlepidoptères* nouveaux ou peu connues. Ann. Soc. Ent. Fr. (6) v, pp. 397-422.

24 species. Locality not given, but apparently all French.

386. LAMPA, S. Några iakttagelser angående luktorganet hos *Bombyx quercus*, L. Ent. Tidskr. 1886, pp. 155-158. [*Lepidoptera*.]

He considers that the male finds the female entirely by the sense of smell (*cf. op. cit.* p. 203).

387. LAMPERT, K. Die Mauerbiene und ihre Schmarotzer. JH. Ver. Württ. xlii, pp. 89-101.

Miscellaneous observations on *Chalicodoma muraria* and its various parasites: he records 16 species as living at the expense of this Bee. [For summary, see J. R. Micr. Soc. 1887, pp. 225 & 226.]

388. LANSBERGE, J. W. VAN. Les *Coprides* de la Malaisie. Tijdschr. Ent. xxix, pp. 1-25. [*Coleoptera*.]

All the species, including several novelties, are described.

389. —. Description d'un *Cerambycide* de Sumatra appartenant à un Genre nouveau de la tribu des *Disténides*. Notes Leyd. Mus. viii, p. 35. [*Coleoptera*.]

390. —. *Scarabæides*, *Buprestides*, et *Cerambycides* de l'Afrique occidentale envoyés au Musée de Leyde par M. M. Veth et Van der Kellen. T. c. pp. 69-120. [*Coleoptera*.]

45 new species of the first, and 3 each of the other two families. 4 new genera.

391. —. Description de quelques *Scarabæides* des Indes Néerlandaises appartenant au Musée de Leyde. T. c. pp. 131-137. [*Coleoptera*.]

392. LEECH, J. H. British *Pyalides*, including the *Pterophoridae*. London: 1886, 121 pp., 18 pls. [*Lepidoptera*.]

"The object of this is to set before the student an illustrated list of the British examples of this group, and the localities and conditions in which each species has been found, the dates of their appearance, and also a brief description of their larvæ and food-plants." The *Crambidae* are included, and the figures are coloured.

393. —. On a variety of *Anthocharis eupheno* from Mogador. P. Z. S. 1886, p. 122. [*Lepidoptera*.]

394. LEFÈVRE, —. *Coléoptères Phytophages* nouveaux de l'Afrique tropicale. Notes Leyd. Mus. viii, pp. 145-148.

— [See also BAER.]

395. LEMOINE, V. Sur l'appareil digestif du *Phylloxera*. C.R. cii, pp. 220-222. [Summary (brief) J. R. Micr. Soc. (2) vi, p. 238.]

396. —. Sur l'organisation et les métamorphoses de l'*Aspidiotus* du Laurier-rose. C.R. ciii, pp. 1200-1203. [*Rhynchota*.] [Summary, J. R. Micr. Soc. 1887, p. 76.]

397. LENG, C. W. *Synopses of Cerambycidae*. Ent. Ann. ii, pp. 27-32, 60-63, 81-83, 102, 103, 118-120, & 193-200. [*Coleoptera*.]

398. LETHIERRY, L., & CARPENTIER, L. Matériaux pour le Catalogue des *Hyménoptères* du Nord, du Pas-de-Calais, de la Somme et de l'Oise. Mem. Soc. L. N. Fr. vi, pp. 247-267.

First part devoted to *Tenthredinidae*, and comprising 229 species.

[LETHIERRY, L.] [See also PUTON, A. (568).]

399. LEYDIG, F. Die Hautsinnesorgane der Arthropoden. Zool. Anz. ix, pp. 284-291 & 308-314.

Looking on all the presumed sensitive hair- or seta-like structures as modifications of the ordinary external hair, he discusses the structure of this, and afterwards the structure and functions of various organs of sense. [For summary, *vide* J. R. Micr. Soc. (2) vi, pp. 962 & 963.]

400. LEWIS, G. A new species of *Brathinus*. Ent. M. M. xxiii, p. 85. [*Coleoptera*.]

401. LICHTENSTEIN, J. Monographie des *Pucerons* du peuplier. Montpelier : pp. vi & 42. [*Rhynchota*.]

Recognizes 13 species; besides giving biological observations on them, discusses their synonymy, which is apparently difficult as well as extensive.

402. —. *Schizoneura (Artemisia karschii, Licht.)*. Ent. Nachr. xii, pp. 81-83. [*Rhynchota*.]

403. LIEBEL, R. Die Zoocecidien (Pflanzendeformationen) und ihre Erzeuger in Lothringen. Z. Naturw. lix, pp. 531-579.

A catalogue of galls, accompanied by brief descriptions, arranged according to the plants on which they occur.

404. LIEGEL, E. Verzeichniss der in den Jahren 1881-1885 bei Feldkirchen und Gnesau beobachteten *Coleopteren*. Ein Beitrag zur Käferfauna Kärntens. JB. Mus. Kärnt. xviii, pp. 9-51.

405. LIST, J. H. Ueber die Entstehung der Dotter- und Eizellen bei *Orthezia cataphracta*, Shaw. Biol. Centralbl. vi, pp. 485-488.

406. —. *Orthezia cataphracta*, Shaw, Eine Monographie. Z. wiss. Zool. xlv, pp. 1-86, pls. i-vi. [*Rhynchota*.]

Devoted to the anatomy and histology of the female of this species. Discusses specially the integument and its waxy covering, the dorsal and ventral aspects, and the chitinous skeleton, muscular and tracheal systems, and the parts of the mouth; these latter show important divergencies from the description made by Mark of the corresponding parts in *O. characias*, Bosc. Next he takes up the alimentary canal, Malpighian vessels, salivary glands, nervous system and organs of sense; the dorsal vessel, and the sexual structures of the female, the histology of the ovary, the formation of the yolk-cells, and of the egg-cells; and the fat-bodies. The formation of the yolk-cells he finds to be different from what has been described as occurring in other insects. The plates are chiefly devoted to histology. [For summary, *vide* J. R. Micr. Soc. 1887, pp. 228 & 229.]

407. LOEW, E. Eine Lippenblume mit Klappvisier als Schutzrichtung gegen Honig- und Pollenraub. Kosmos, xix, pp. 119-122.

408. [LOEW, E.] Während der Blütezeit verschwindende Honigsignale. *T. c.* pp. 194-197.

These two memoirs concern the relations between flowers and insects (*Bombi*).

409. Löw, F. Cecidiologische Notizen. Verh. z.-b. Wien, xxxvi, pp. 97-102.

Relates to galls of *Hormomyia piligera*, Lw., and *Cecidomyia taxi*, Inchb.

410. —. Neue Beiträge zur Kenntniss der *Psylliden*. *T. c.* pp. 149-170, pl. vi. [*Rhynchota*.]

Descriptions of new species and remarks on others; all European, except one from Mexico.

411. MACLEAY, W. The Insects of the Fly River, New Guinea. P. Linn. Soc. N. S. W. (2) i, pp. 136-157 & 183-204. [*Coleoptera*.]

The collection consisted of 295 species, which are enumerated and the novelties described, except in the case of the *Phytophaga*, which are omitted in order to avoid clashing with Jacoby. The Coleopterous fauna is considered to be "wonderfully limited."

412. —. Miscellanea entomologiæ. I. The Genus *Diphucephala*, *T. c.* pp. 381-402. [*Coleoptera*.]

A monograph of the genus, comprising 40 species, 18 new.

413. —. Miscellanea entomologiæ. II. The Genus *Liparetus*. *T. c.* pp. 807-852. [*Coleoptera*.]

Recognizes 97 species, no less than 55 being new.

414. MACLACHLAN, R. *Chloroperla capnoptera*, n. sp. Tijdschr. Ent. xxix, p. 157. [*Neuroptera*.]

415. —. Une excursion *Neuropterologique* dans la Forêt Noire. Rev. d'Ent. v, pp. 126-136.

A list of the species met with, remarks on synonymy, habits, specific characters, &c.

416. —. Two New Species of *Corduliina*. Ent. M. M. xxiii, pp. 104 & 105. [*Neuroptera*.]

417. MACMUNN, C. A. Note on a Method of Obtaining Uric Acid Crystals from the Malpighian Tubes of Insects. J. Physiol. vii, p. 128.

418. MAGRETTI, P. Varietà e specie nuove di *imenotteri terebranti Tentredinidei*. Bull. Soc. Ent. Ital. xviii, pp. 24-29.

419. —. Diagnosi di alcune specie nuove d'*imenotteri Pompilidei* raccolte in Lombardia. Bull. Ent. Ital. 1886, pp. 402-405. [*Hymenoptera*.]

420. MARSEUL, S. L'Abeille journal d'Entomologie. Paris: 1886, Nos. 301-312. [*Coleoptera*.]

These parts are devoted chiefly to reprints of descriptions of Clavicorns, extending as far as *Thorictidae*. Pp. 145-168 of the Catalogue of

the *Coleoptera* of the "Ancient" World, extending to *Elateridae*, have also been published in it, and pp. 109-156 of the monographie des Chrysomélides de l'ancien monde, and lists of the writings of Castelnau, Chevrolat, and Motschoulsky.

421. [MARSEUL, S.] *Histérides et Anthicides nouveaux* du Musée de Leyde. Notes Leyd. Mus. viii, pp. 149-154. [*Coleoptera*.]

422. MARSHALL, T. A. On the Study of Entomology. Wilt. Mag. xxiii, pp. 51-59.

423. MASTERS, G. Catalogue of the Described *Coleoptera* of Australia. P. Linn. Soc. N. S. W. x, pp. 583-672, (2) i, pp. 21-130, 259-380, & 585-686.

Extends as far as the end of *Curculionidæ*; the number of species being thus far 5624.

424. MATHEW, G. F. Descriptions of some new species of *Rhopalocera* from the Solomon Islands. P. Z. S. pp. 343-350, pl. xxxiv.

Includes a new genus and 6 new species. These islands he expects will prove very rich in Insects.

425. MATTHEWS, A. Description of a new genus, and some new species of *Corylophidæ*. Ent. M. M. xxii, pp. 224-228. [*Coleoptera*.]

426. —. *Corylophidarum* species novæ e musæo floriano. Bull. Ent. Ital. 1886, p. 432. [*Coleoptera*.]

427. MAUVEZIN, C. L'instinct des hyménoptères. Rev. Sci. 1886 (i) pp. 427-430.

Discusses Fabre's observations and views.

428. MAYNARD, C. J. The Butterflies of New England, with original descriptions of 106 species, accompanied by eight lithographic plates, in which are given at least two hand-coloured figures of each species. Boston, Mass.: 1886.

A few varieties are figured in addition to the species.

429. MAYR, G. Notizen über die *Formiciden*-Sammlung des British Museum in London. Verh. z.-b. Wien, xxxvi, pp. 353-368. [*Hymenoptera*.]

Refers many species described by Smith to other genera, and gives miscellaneous remarks on others; where the remarks are only intelligible by aid of the B. M. collection, they are not noticed in our systematic record.

430. —. Eine neue *Cynipide* aus Mexico. T. c. p. 369, pl. xii. [*Hymenoptera*.]

431. —. Die *Formiciden* der Vereinigten Staaten von Nord-Amerika. T. c. pp. 419-464. [*Hymenoptera*.]

This is a revision of the Ants as yet known from the United States of N. America. Besides a list of species and numerous synonyms, it notices various known species and describes several novelties: the species noticed are not specially mentioned in our Systematic Record. The list includes 105 species.

432. [MAYR, G.] Ueber *Eciton-Labidus*. Wien. ent. Z. v, pp. 33-36 & 115-122. [*Hymenoptera*.]

Describes 2 new species of *Eciton*, the male of which is a *Labidus*.

MEADE, R. H. [See INCHBALD.]

433. MEINERT, F. Die eucephale Mygalarver (Sur les larves eucéphales des *Diptères*. Leurs mœurs et leurs métamorphoses). Dan. Selsk. Skr. iii, pp. 373-493, pls. i-iv.

Descriptions and figures of the larvæ of 9 genera, and a generalisation of the observations under "theses." A *résumé* in French is given, pp. 476-493, in which he states that he has proposed a new theory of the development of the trachea in Insects; thesis 19 states it thus: "l'appareil respiratoire, chez les insectes, ne peut-être regardé comme une pure et simple formation de l'épiderme, ni comme résultant seulement de l'invagination de l'épiderme; mais le tissu conjonctif participe plus ou moins à la formation de l'appareil, celui-ci n'étant complété que par l'anastomose des invaginations centripètes de l'épiderme avec la formation centrifuge du tissu conjonctif. Chez les larves dont nous nous occupons ici, les cordes latérales représentent essentiellement les invaginations de l'épiderme."

434. —. Gjennemborede kindbakker hos *Lampyris* og *Drilus*-larverne. Ent. Tidskr. 1886, pp. 194-196 & 206. [*Coleoptera*.]

It appears that the mandibles in these larvæ are canaliculate, as they are in some other larvæ that feed on living creatures.

435. —. Lidt om *Tachina*-larvens snylten i andre insektlarver. *T. c.* pp. 191-193 & 205.

Particulars as to the mode of life of *Tachina* sp. ? in the larva of *Lina populi* and of *Cimbex*.

436. —. Tungens Udskydelighed hos Steninerne en Slægt af Staphylinernes Familie. Vid. Medd. 1884-86, pp. 180-207, pls. xv & xvi.

In addition to discussing the peculiarities of the labrum in *Stenus*, he figures for comparison this organ in some of the neighbouring groups.

437. MEYRICK, E. Descriptions of Australian *Micro-Lepidoptera*. XII *Æcophoridae* (continued). P. Linn. Soc. N. S. W. x, pp. 765-832.

This completes the descriptions of this group, and includes a first appendix of new species. There are a few New Zealand species in it.

438. —. On some *Lepidoptera* from the Fly River. *Op. cit.* (2) i, pp. 241-258.

A small collection of 25 species of *Heterocera*, 15 being new.

439. —. Revision of Australian *Lepidoptera*. I. *T. c.* pp. 687-802.

Comprises 5 families of the *Macro-Lepidoptera*: *Sesiadæ*, *Arctiadæ* (in which he includes *Lithosiadæ*), *Syntomidæ*, *Zygenidæ*, and *Hypsidæ*, *Nyctemera* and allies being included in this latter family. 172 species are described, a large portion being new, with many new genera. Many species of Walker's are redescribed, and referred to other genera. A few New Zealand species are included.

440. [MEYRICK, E.] Description of New Zealand *Micro-Lepidoptera*. Tr. N. Z. Inst. xviii, pp. 162-183.

441. —. Notes on nomenclature of New Zealand *Geometrina*. T. c. p. 184. [*Lepidoptera*.]

13 new names of genera.

442. —. On the classification of the *Pterophoridae*. Tr. Ent. Soc. 1886, pp. 1-21. [*Lepidoptera*.]

He considers that *Pterophoridae* are a family of *Pyralidina* of similar value with the *Botyridae*, &c. There are phylogenetic remarks, such as "in the more advanced forms is found a rapid degradation . . .", and that the family does not "originate from any known existing form, but from an extinct type closely approaching the ancestral form of the *Pyralidina*," "*Mimeseoptilus* is without doubt the oldest of all the known cleft-winged genera." New genera and species are described, the latter exclusively Australian or insular.

443. —. Descriptions of *Lepidoptera* from the South Pacific. T. c. pp. 189-296.

Relates to *Geometridae* and *Micro-Lepidoptera* from Australia and Polynesia; 174 species, mostly new, and many new genera. *Botyridae* are largely predominant. He considers the *Geometridae* to be composed of 7 families, which he tabulates, pp. 190 & 191.

444. MIALL, L. C., & DENNY, A. The structure and life-history of the Cockroach (*Periplaneta orientalis*): an introduction to the study of Insects. London: Lovell Reeve: 1886, 224 pp., woodcuts. [*Orthoptera*.]

Contents:—I. Writings on Insect Anatomy. II. The zoological position of the Cockroach. III. The natural history of the Cockroach. IV. The outer skeleton. V. The muscles, the fat-body and coelom. VI. The nervous systems and sense-organs. VII. The alimentary canal and its appendages. VIII. The organs of circulation and respiration (including a section on the respiratory movements of Insects, by Prof. Felix Plateau, of Ghent). IX. Reproduction. X. Development (including a section on the embryonic development of the Cockroach, by Joseph Nusbaum, of Warsaw). XI. The Cockroach of the past, by S. H. Scudder, of the U. S. Geological Survey. Appendix. Parasites of the Cockroach. Sense of smell in Insects. Chapter VIII also includes a discussion of the question how air can be made to enter the finer portions of the tracheæ; in this the writers have been assisted by Prof. Rucker. There is a set of bibliographical references at the commencement of each chapter.

445. MIEG, T. Aberrations nouvelles de *Lepidoptères* européens. Le Nat. viii, pp. 236 & 237.

9 named varieties, mostly from England.

446. MIK, J. Die *Dipteren*-Genera Paolo Liroy's. Ent. Nachr. xii, pp. 321-328.

Mik considers Liroy's work to have been quite without value, and occupies these pages with a synonymy of his genera. This I have not reproduced in our "systematic" part.

447. [MIK, J.] Eine neue *Dipteren*-Art aus Süd-Tirol. Wien. ent. Z. v, pp. 22-24.

448. —. Ein neues hochalpines *Dipteron*. *T. c.* pp. 57-59.

Found at an elevation of 2875 m., temperature 1° C.

449. —. *Dipterologische* Miscellen. *T. c.* pp. 101, 276, & 317.

450. —. Eine neue *Drosophila* aus Nieder-Oesterreich und den Aschanti-Ländern. *T. c.* pp. 328-331. [*Diptera*.]

451. MILLIÈRE, P. Chenilles nouvelles, *Lepidoptères* nouveaux ou peu connus. Ann. Soc. Ent. Fr. (6) vi, pp. 1-10, pl. i.

Some larvæ, varieties, and 2 new species from Southern Europe.

452. —. Catalogue raisonné des *Lepidoptères* des Alpes-maritimes. Nat. Sic. v, pp. 102, &c.

This catalogue is now completed, the number of species being 3208. It comprises brief remarks on habits, larvæ, and food-plants, &c. No. 3014 is given as "*Nepticula latifoliella*," new species, but without description.

453. —. Chénilles inédites et *Lépidoptères* nouveaux pour la faune européenne. *Op. cit.* vi, pp. 1-9, pl. i.

1 new species of *Tineidæ*.

454. MINOT, C. S. Zur Kenntniss der Insektenhaut. Arch. mikr. Anat. xviii, pp. 37-48, pl. vii.

Relates almost entirely to larvæ of *Lepidoptera*. He says a portion of the skin is sufficient for the determination of the species. [Short summary in J. R. Micr. Soc. 1887, p. 73.]

455. M'NEIL, J. Remarkable case of longevity in a Longicorn Beetle (*Eburia quadrigeminata*). Am. Nat. xx, pp. 1055-1057. [*Coleoptera*.]

Nineteen or twenty years is inferred, not observed.

456. MOCSÁRY, S. Adatok magyarország fürkésdarázsainak ismeretéhez. (Data ad cognitionem *Ichneumonidarum* Hungariæ.) 1. *Ichneumones*, Wesm. Math. term. köz. xx, pp. 51-144, pl. vii. [*Hymenoptera*.]

A list of 204 species, 4 new. There is also a list of parasites and hosts, pp. 138 & 139.

457. —. A magyarországi fa-ronto darázsok. Rov. Lapok, iii, pp. 9, &c. [*Hymenoptera*.]

A monograph of the *Siricides* of Hungary, with descriptions of several new species.

458. —. Species aliquot *Tenthredinarum novæ*. Ent. Nachr. xii, pp. 2 & 3. [*Hymenoptera*.]

3 species briefly described.

459. MOLEYRE, L. Insectes et Crustacés comestibles. Bull. Ins. Agr. xi, pp. 29, &c.

460. MÜLLER, G. F. Om kålfjärillarvens parasiter. Ent. Tidskr. 1886, pp. 81-85 & 137. [*Lepidoptera, Hymenoptera.*]

Includes description of a new species of *Tetrastichus*.

461. —. Parasitkläckningar. T. c. pp. 87 & 88. [*Hymenoptera, Lepidoptera, Diptera.*]

A list of 18 parasites, and the insects from which they were bred.

462. MONTANDON, A. Hémiptères-Hétéroptères des environs de Gorice et description d'une espèce nouvelle. Rev. d'Ent. v, pp. 105-111.

A list of nearly 200 species, with a few remarks.

463. MOORE, F. The *Lepidoptera* of Ceylon. Vol. iii, pp. 305-392, pls. clxxxii-cxcv.

Part xii completing the *Pyralidæ* and *Crambidæ*, and commencing the *Geometridæ* (the plates being much in advance of the text), has been published in 1886. Part xiii is to complete the work. [*Cf. Zool. Rec. xxii, Ins. Titles (224).*]

464. —. List of the *Lepidoptera* of Mergui and its Archipelago, collected for the Trustees of the Indian Museum, Calcutta, by Dr. John Anderson. J. L. S. xxi, pp. 29-60, pls. iii & iv.

The collection consisted of 208 species of *Rhopalocera*, 64 of *Heterocera*; 11 of the former, 1 of the latter, are described as new.

465. —. List of the *Lepidopterous* Insects collected in Tavoy and in Siam during 1884 & 1885 by the Indian Museum Collector. Part i. *Heterocera*. J. A. S. B. lv, pp. 97-101.

40 species, 6 being new.

466. MORAWITZ, A. Zur Kenntniss der chilenischen Carabinen. Mém. biol. xii, pp. 325-414. [*Coleoptera.*]

Discusses the varieties and species at length, and describes several as new, and proposes 4 groups for the species of the genus.

467. —. Zur Kenntniss der *Adephagen, Coleopteren*. Mém. Ac. Pétersb. xxxiv, No. 9, pp. 1-88.

Describes 18 new species of *Carabus* from Central Asia and one *Culosoma*: proposes several new subgenera. The greater part of the paper is devoted to a very detailed but unsystematic criticism of the modern works on *Carabides*, Thomson's views especially being considered unsatisfactory. The synonymy of many subgenera and species is discussed minutely, but in a more or less problematic manner, and is therefore not recorded in our systematic pages. He states that the Central Asian *Carabi* are extraordinarily variable.

468. MORAWITZ, F. Neue transcaucasische *Apidæ*. Hor. Ent. Ross. xx, pp. 57-81. [*Hymenoptera.*]

16 species.

469. —. Insecta in itinere A. N. Przewalskii in Asia Centrali novissime lecta. I. *Apidæ*. T. c. pp. 195-229. [*Hymenoptera.*]

50 species, about one half of them new.

470. MÖSCHLER, H. B. Beiträge zur Schmetterlings-Fauna von Jamaica. Abh. senck. Ges. xiv, pp. 25-84, sep. pag., plate. [*Lepidoptera*.]

A list of 197 species, 27 of them *Rhopalocera*, 172 *Heterocera*; 71 are new, and there are 14 new genera. He considers they are only a small part of the *Lepidoptera* of the island, and were collected at two Mission-stations in the south of the island. I have recorded this from a separate copy; the pagination is, I believe, not that of the original periodical.

471. MÜLLENHOFF, —. Apistische Mittheilungen. I. Ueber den Zellenbau der Hönigbiene. II. Ueber das Verfahren der Hönigbiene bei der Bergung und Conservirung von Blütenstaub und Hönig. Arch. f. Phys. 1886, pp. 371-375 & 382-386.

Relates to both habits and instincts. [For summary, *vide* J. R. Micr. Soc. (2) vi, pp. 382 & 594.]

472. MÜLLER, F. Feigen-wespen. Kosmos, xviii, pp. 55-62; also *Critogaster* and *Trichaulus*, *op. cit.* xix, pp. 54-56. [*Hymenoptera*.]

A summary of Mayr's 1885 paper [*cf.* Zool. Rec. xxii, *Ins.* Titles, (213)], with the addition of fresh observations and remarks on Brazilian fig-frequenting *Hymenoptera*. The second note is to correct the first.

473. —. On Fig-Insects. P. E. Soc. 1886, pp. x & xi. [*Hymenoptera*.]

Refers positively some of the genera described by Mayr as being distinct to the position of apterous males of species for which other genera were established. "Thus we have among the fig-insects of the Itajahy at least seven trimorphic species, consisting of females, winged, and wingless males."

474. —. Zur Kenntniss der Feigen-insecten. Ent. Nachr. xii, pp. 193-199.

Apparently the same matter as that in Proc. Ent. Soc. [*cf.* also Ludwig Biol. Centralbl. vi, pp. 120 & 121, where the same facts are briefly repeated.]

475. MÜLLER, W. Südamerikanische Nymphalidenraupen. Versuch eines Natürlichen Systems der *Nymphaliden*. Zool. JB. i, pp. 417-678, pls. xii-xv. [*Lepidoptera*.]

This describes a large number of larvæ and pupæ of butterflies observed by the author during a visit to Brazil; the descriptions usually refer to all the stages of the larvæ, Weismann's nomenclature being used; the food-plants are mentioned, and species described by other authors are alluded to, so as to give a general idea of the larvæ in the family. He includes *Acrevinæ*, *Heliconinæ*, *Nymphaliniæ*, *Brassoliniæ*, *Morphinæ*, and *Satyrinæ* as subfamilies, and gives a supplement relating to larvæ of *Danainæ*. In addition to this large contribution to descriptive entomology, the memoir contains much other matter. The development of the markings, their character, whether protective or otherwise, and their relations to tubercles are discussed; much attention is given to the

spines, various points in connection with these being discussed at length. Some considerations in reference to the classification of the family are offered, and also as to the phylogeny of the larvæ and pupæ and the relations of the various stages of the larvæ and of the larvæ and pupæ to one another. In an appendix, the primary setæ of other families of *Lepidoptera*, the spines of the *Saturniidae*, and the caudal horn of *Sphinxidae* are treated of; this latter he considers to be a remnant of a former larger development of the spines, homologous therefore with the dorsal spines of *Saturniidae*. Finally, he recognizes three kinds of genesis for the spiny appendages of Caterpillars. The plates represent larvæ and pupæ, and details of their appendages, the cephalic horns being freely exhibited. [For note on this memoir, *vide* Ent. Nachr. xii, pp. 346-348.]

476. —. Schutzvorrichtungen bei nymphalidenraupen. Kosmos, xix, pp. 351-361.

He first arranges the various kinds of protection of animals in two divisions, and then distinguishes different classes of his two groups. He gives numerous general statements as to the peculiarities of the larvæ in many genera of *Nymphalidae*, and the various ways in which they offer protection. He states briefly his views as to their phylogeny (p. 357), and remarks on the peculiarities of coloration of the larvæ in some other families of diurnal *Lepidoptera*, particularly *Hesperidae*, and considers the question how a change in the means of protection may be possible; he thinks it may be because no mode of protection is perfect.

477. —. Beobachtungen an Wanderameisen (*Eciton hamatum*, Fabr.). *Op. cit.* xviii, pp. 81-93. [*Hymenoptera*.]

Describes a migration of the *Eciton* to a new nest, and also gives circumstances supporting the idea that *Labidus* is the male of *Eciton*.

478. —. Ueber die Gewohnheiten einiger *Oncideres*-Arten. *Op. cit.* xix, pp. 36-38. [*Coleoptera*.]

Brief account of the habits of 3 Brazilian species of this *Cerambycid* genus.

479. NASSONOW, —. Welche Insekten-Organe dürften homolog den Segmental-Organen der Würmer zu halten sein? Biol. Centralbl. vi, pp. 458-462, woodcut.

He concludes that the vasa deferentia of the male sexual organs and the thoracic salivary glands of insects are the homologues of the segmental organs of worms.

480. NEUHAUS, G. H. *Diptera* Marchica. Systematisches Verzeichniss der Zweiflügler der Mark Brandenburg mit Kurzer Beschreibung und analytischen Bestimmungs-Tabellen. Berlin: 1886, pp. xvi & 371, pls. vi.

The nature of this handbook is explained by the title; the plates give the neururation of the different groups. [Reviewed Deutsche e. Z, xxx, pp. 445 & 446, and Wien. ent. Z. v, p. 286.]

481. NEVINS, J. B. On Recent Locust Plagues in Cyprus and in North America. *P. Liverp. Soc.* xl, pp. 123-162, pls. i-v.

A large amount of information, taken chiefly from Parliamentary Reports, and Reports of the United States Entomological and Agricultural Commissions.

482. NICÉVILLE, L. DE. The Butterflies of India, Burmah, and Ceylon. A Descriptive Handbook of all the Known Species of Rhopalocerous *Lepidoptera* inhabiting that region, with Notices of Allied Species occurring in the Neighbouring Countries along the Border; with numerous illustrations. Calcutta & London: vol. ii, pp. 1-332, pls. xviii-xxiv, and frontispiece.

For the previous part of this work *cf.* *Zool. Rec.* 1883, *Ins.* p. 161. This second vol. treats of the *Nymphalinae* and *Lemoniidae*; it includes 318 species, making the number included in the at present published parts of the work 616. There are many notes on habits, and localities are freely given. Both genera and species are described at length, the descriptions being frequently those of previous writers; there are remarks on seasonal and dimorphic forms. Much synonymy is suggested, but not formally adopted by the author, and these synonyms are not mentioned in the systematic part of our record. The plates are autotype, uncoloured.

483. —. On the Life-history of certain Calcutta Species of *Satyrinae*, with Special Reference to the Seasonal Dimorphism alleged to occur in them. *J. A. S. B.* lv, pp. 229-238, pl. xii.

He has proved the dimorphism in four cases by breeding. The plate has not yet appeared.

484. —. On some new Indian Butterflies. *T. c.* pp. 249-255, pl. xi. [*Lepidoptera.*]

9 species.

485. *NICKERL, O. Bericht über die im Jahre 1885 die Landwirthschaft Böhmens schädlichen *Insecten*. Prague: 1886, 15 pp. (*cf.* *Wien. ent. Z.* v, p. 286).

486. NICOLAS, H. Sur l'arrêt complet de développement des larves d'*hyménoptères* entre la période larvaire et la forme de nymphe; sur la preuve que certains actes ne sont pas guidés par l'instinct, et sur le parasitisme. *C.R. Ass. Fr. Sci.* xiv (2) pp. 457-460.

487. —. Les instincts de quelques *Hyménoptères*. *Rev. Sci.* 1886 (ii) pp. 330-336.

This discusses M. Fabre's views and observations; the writer is a pupil of the French savant, but arrives at somewhat different conclusions.

488. NORDIN, J. Anteckningar öfver *Hemipterer* II. *Ent. Tidskr.* 1886, pp. 31-34.

Faunistic and miscellaneous observations on about 12 species.

489. NOTTHAFT, J. Die physiologische Bedeutung des facettierten Insectenauges. *Kosmos*, xviii, pp. 442-450.

From the occurrence of ocelli and faceted eyes in the same creature,

he considers that the faceted eye of Insects must have a different function from the eye of the *Vertebrata*; this he also supports by a brief contrast of their respective structures. The faceted eye he considers to be unfavourable for plane perceptions, and that its special advantage is appreciation of the third dimension of space—depth. He alludes to the origin of ocelli and faceted eyes by evolution from a hypothetical, undeveloped primitive form, that could be developed in two directions. He contrasts the functions of ocellus and faceted eye, and considers the ocellus as usually associated with high intelligence.

490. NUSSBAUM, J. Struna i struna Leydig'a u owadów. Lemberg. Kosmos, 1886, pp. 225–243, pls. i & ii.

This is a histological paper in Polish, relating chiefly to *Lepidoptera*. [For brief summary, *vide* J. R. Micr. Soc. 1887, p. 73.]

— [See also MIALl & DENNY.]

491. OBERTHÜR, C. Études d'Entomologie. Livraison xi. Nouveaux *Lépidoptères* du Thibet. Rennes: December, 1886, 38 pp., pls. i–vii.

Numerous new species of *Rhopalocera* and *Heterocera*.

492. —. New *Lepidoptera* from Thibet [without special title, scattered in Bull. Soc. Ent. Fr. (6) v, pp. cccxvi–ccxxx, &c.].

493. OERTZEN, E. v. Verzeichniss der *Coleopteren* Griechenlands und Cretas. B. E. Z. xxx, pp. 189–293.

Includes 3518 species; 12 pages are devoted to general remarks and some local lists.

494. OESTLUND, O. W. Entomology. Rep. Surv. Minnesota, xiii, pp. 113–123.

Report on the Insects (chiefly *Lepidopterous*) injurious to cabbage in Minnesota.

495. —. List of the *Aphididae* of Minnesota, with descriptions of some new species. *Op. cit.* xiv, pp. 17–56. [*Rhyncho*ta].

Includes 2 new genera and many new species.

496. OLIVIER, E. Études sur les *Lampyrides*, II. Ann. Soc. Ent. Fr. (6) vi, pp. 201–246, pl. iii. [*Coleoptera*.]

This is a monograph of the genus *Photuris*.

497. —. *Lampyrides* nouveaux ou peu connus. Description des espèces nouvelles rapportés du Brésil par M. Gounelle. Rev. d'Ent. v, pp. 1–8. [*Coleoptera*.]

11 species.

498. —. *Lampyrides* nouveaux ou peu connus du Musée de Leyde. Notes Leyd. Mus. viii, pp. 191–194. [*Coleoptera*.]

499. —. Revision du genre *Pyrocalia*, Gorh. T. c. pp. 195–208. [*Coleoptera*.]

Recognizes 22 species, 9 being new.

— [See also BAER (21).]

500. OLLIFF, A. S. A revision of the *Staphylinidæ* of Australia, part I, pp. 403-473, pl. vii; part II, pp. 887-907. P. Linn. Soc. N.S.W. (2) i. [*Coleoptera*.]

Includes *Aleocharinæ* and *Tachyporinæ*. 108 species, with a considerable number of novelties.

501. ——. A list of the *Trogositidæ* of Australia, with notes and descriptions of new species. *Op. cit.* x, pp. 699-715. [*Coleoptera*.]

Records 28 species, 8 being new.

502. ——. Remarks on Australian *Pltinidæ*, and descriptions of new genera and species. *T. c.* pp. 833-840. [*Coleoptera*.]

2 new genera, 9 new species.

503. ——. Contributions towards a Knowledge of the *Coleoptera* of Australia. No. 3, On the genus *Nascio*. *Op. cit.* (2) i, pp. 861-864.

504. ——. A new Butterfly of the family *Lycaenidæ* from the Blue Mountains. *Op. cit.* x, p. 716. [*Lepidoptera*.]

505. ——. Description of a new *Aphanipterous* Insect from New South Wales. *Op. cit.* (2) i, pp. 171 & 172.

A Flea that cannot jump, found on *Echidna hystrix*.

506. OMBONI, G. Di alcuni insetti fossili del Veneto. *Atti Ist. Venet.* (6) iv, pp. 1421-1434, pls. xv-xvii.

Gives some particulars as to specimens in the Museum at Padua, relating more especially to some described by Massalongo in 1855; mentions one or two considered to be new, and describes also one or two in a very imperfect manner. The plates also are very poor.

507. OSTEN-SACKEN, —. Studies on *Tipulidæ*. Part I, Review of the published genera of the *Tipulidæ longipalpi*. *B. E. Z.* xxx, pp. 153-188. [*Diptera*.]

508. ——. Some new facts concerning *Eristalis tenax*. *Ent. M. M.* xxiii, pp. 97-99. [*Diptera*.]

Relates to its naturalisation in N. America. Suggests that this Fly, from its resemblance to a Bee, may have been what old writers referred to when they mentioned the swarming of Bees about carcasses.

——. [See also GODMAN & SALVIN.]

509. ORMEROD, E. A. Report of observations of injurious Insects and common farm pests during the year 1885, with methods of prevention and remedy. Ninth report. London: 1886.

The most important part of this report is that relating to *Hypoderma bovis*.

510. ——. *Id.* during 1886. Tenth report. London: 1887.

In this will be found an account of the first appearance of Hessian Fly in this country, being a reprint of the pamphlet mentioned below.

511. ——. The recent appearance of the Hessian Fly, *Cecidomyia destructor*, in Great Britain. *J. R. Agric. Soc.* (2) xxii, pp. 721-727.

512. *——. The Hessian Fly in Great Britain. London: 1886.

513. *PACKARD, A. S. Zoology for High Schools and Colleges. Fifth edition revised. New York : 1886.

Pp. 307-368 are occupied with Insects. *Ametabola* and *Metabola* have each 8 orders ; the new name *Plectoptera* is proposed for the May-flies, and *Mecaptera* for *Panorpa*, his order *Platyptera* being now restricted to the White Ants and Bird-lice. In Am. Nat. xx, p. 808, there is a list of the orders adopted in this work.

514. *——. First lessons in Zoology. New York : 1886.

Insects are treated on pp. 90-128, with full-page woodcuts.

515. *——. Briefer Zoology. 3rd edition : 1886.

Contains practically the same classification as the preceding.

516. ———. On the nature and origin of the so-called "spiral thread" of *Tracheæ*. Am. Nat. xx, pp. 438-442 & 558. [For summary, vide J. R. Micr. Soc. (2) vi, pp. 789 & 790.]

517. ———. On the Cinurous *Thysanura* and *Symphyla* of Mexico. Am. Nat. xx, pp. 382 & 383.

518. PAGENSTECHER, A. Beiträge zur *Lepidopteren*-Fauna des malayischen Archipels. III *Heteroceren* der *Aru*-Inseln, *Kei*-Inseln und von Südwest-Neu-Guinea. JB. nass. Ver. xxxix, pp. 104-194, pl. x.

A list, with full synonymy of 180 species, many new, and also a table of the geographical distribution.

519. ———. *Heteroceren* der Insel Ceram. CB. Iris, pp. 41-44, pls. ii & iii. [*Lepidoptera*.]

A list of 82 species, 4 of them new.

520. PANTEL, S. J. Contribution à l'*Orthopterologie* de l'Espagne centrale. An. Soc. Esp. xv, pp. 237-287, pl. ii.

Consists of two parts, viz., descriptions of new species and catalogue of the species of the district ; this second part contains many observations on variation, habits, structure, &c.

521. PASCOE, F. P. List of *Curculionidæ* found by Mr. Van Volxem in the neighbourhood of Rio Janeiro. C.R. ent. Belg. 1886, pp. cli-clvi. [*Coleoptera*.]

2 new genera, 6 new species.

522. ———. On new African Genera and Species of *Curculionidæ*. J. L. S. xix, pp. 318-336, pl. xli. [*Coleoptera*.]

11 new genera, 32 new species.

523. ———. Descriptions of some new Longicornia, chiefly Asiatic and African. Ann. N. H. (5) xvii, pp. 239-246. [*Coleoptera*.]

12 species, 5 new genera.

524. ———. New Neotropical *Curculionidæ*. Part vi. T. c. pp. 415-428. 6 new genera, and 26 species of various groups.

525. PATTEN, W. Eyes of Molluscs and Arthropods. MT. z. Stat. Neap. vi, pp. 542-746, pls. xxviii-xxxii.

The entomological part of this paper is small, but the eye in *Mantis*

is described, and the general portion contains many references to, and remarks on, the eye of Insects. According to the table on p. 732, the compound eye of Insects is thus defined : ommatidia aggregate, chromatophores devaginate, ommateum diploblastic, there is a modified optic vesicle, and a corneal cuticula present.

526. PERÉNYI, J. A hernyók conserválása. *Rov. Lapok*, iii, pp. 167-170 & xxiii. [*Lepidoptera*.]

Gives the composition of a liquid in which Caterpillars can be satisfactorily preserved.

527. PÉREZ, J. Des effets du Parasitisme des Stylops sur les Apiaries du genre *Andrena*. *Act. Soc. L. Bord.* xl, pp. 21-60, pls. i & ii. [*Hymenoptera*.]

The list of species of the genus known to be styloped is raised to 60 ; the exterior changes produced by the parasite are discussed (pp. 23-33) ; the internal changes (pp. 34-41) ; the direct causes of the modifications (pp. 44-48) ; some secondary peculiarities of stylopisation (pp. 48-51).

528. ——. Sur l'histogénèse des éléments contenus dans les gaines ovigères des Insectes. *C.R.* cii, pp. 181-183 & 557-559.

Sabatier has a note on this, *t. c.* p. 441.

529. PERO, P. Nota sui Peli-Ventose de tarsi de Coleotteri. *Boll. Mus. Tor.* i, No. 13.

Short supplement of 3 pages to the previous researches of Camerano and Simmermacher.

530. POKORNY, —. Vier neue österreichische *Dipteren*. *Wien. ent. Z.* v, pp. 191-196.

531. POLETAJEWA, O. Du cœur des Insectes. *Zool. Anz.* 1886, pp. 13-15.

Relates to the heart of *Bombus* and *Cimbex*. The writer is not quite in accord with previous authorities, and points out that the first (posterior) chamber of the heart does not act as a propeller, and that the ostia only close imperfectly. [For Summary, *vide J. R. Micr. Soc.* (2) vi, p. 424.]

532. POLL, J. R. H. N. VAN DE. Les *Cicindélides* de l'île de Curacao, avec description d'une *Tetracha* nouvelle. *Notes Leyd. Mus.* viii, pp. 225-227. [*Coleoptera*.]

533. ——. Description d'une espèce nouvelle du genre *Eucamptognathus*, Chaud. *T. c.* p. 229. [*Coleoptera*.]

534. ——. Description of a new *Paussid* from S. Africa. *T. c.* p. 228. [*Coleoptera*.]

535. ——. Description of a second species of the Lucanoid genus *Ægognathus*, Leuthner. *Tijdschr. Ent.* xxix, p. 153. [*Coleoptera*.]

536. ——. Description of a new *Cetoniid* from West Africa. *T. c.* p. 155. [*Coleoptera*.]

537. [POLL, J. R. H. N. VAN DE.] Five new *Cetoniidae* belonging to the *Lomaptera*-group. *T. c.* pp. 181-188. [*Coleoptera*.]
For remarks on the synonymy of some of these species, see Kraatz, *Deutsche e. Z.* xxx, pp. 301 *et seq.*
538. —. On the Classification of the Genus *Lomaptera*. *Tijdschr. Ent.* xxix, pp. 146-156. [*Coleoptera*.]
[*Cf.* Kraatz, *Deutsche e. Z.* xxx, pp. 301 *et seq.*]
539. —. Four New *Cetoniidae* from Central and South America. *Notes Leyd. Mus.* viii, pp. 231-237. [*Coleoptera*.]
540. —. Novum genus *Gymnetinorum*. *T. c.* p. 138. [*Coleoptera*.]
541. —. Description of Three New Species, and a Synopsis of the *Buprestid* Genus *Nascio*. *T. c.* pp. 121-125. [*Coleoptera*.]
542. —. Description of Three New Species, and a Synopsis of the *Buprestid* Genus *Astræus*. *T. c.* pp. 175-180. [*Coleoptera*.]
543. —. A New *Buprestid* Genus and Species from the Aru Islands. *T. c.* pp. 239-241. [*Coleoptera*.]
544. —. Description of a New *Gnostid*. *T. c.* p. 238. [*Coleoptera*.]
545. —. A New Species of the Heteromorous Genus *Leiochrinus*. *T. c.* p. 34. [*Coleoptera*.]
546. —. On a New *Longicorn* Genus and Species belonging to the *Agniidae*. *T. c.* p. 27, fig. [*Coleoptera*.]
547. —. On Two New and some already-known *Longicorns* belonging to the *Batoceridae*. *T. c.* pp. 29-33. [*Coleoptera*.]
548. —. Description of a New Australian *Longicorn*. *T. c.* p. 223. [*Coleoptera*.]
549. PERRIN, ABEILLE DE. Priorité absolue ou Prescription? *Ann. Soc. Ent. Fr.* (6) vi, pp. 273-282.
A discussion of the great changes in generic names proposed by certain entomologists; these he most strongly objects to. Des Gozis, *t. c.* pp. 469-470, makes a short reply.
550. PETRI, K. Beitrag zur siebenburgischen käferfauna. *Verh. siebenb. Ver.* xxxvi, pp. 72-75. [*Coleoptera*.]
Description of a new Weevil (*Elescus*).
551. PEYRON, J. Sur l'atmosphère interne des insectes comparée à celle des feuilles. *C.R.* cii, pp. 1339-1341. [For Summary, *vide* J. R. *Micr. Soc.* (2) vi, p. 790.]
552. *PLAGNIOL, E. DE. Embryologie de l'œuf du ver-à-soie; avec 1 pl. Privas, impr. du Patriote 1886, 55 pp. [*Cf.* *Zool. Anz.* ix, p. 413.]
553. PLANTA, A. V. *Apistische Beiträge*. I. Ueber die chemische Zusammensetzung des Blütenstaubes der Haselstande und der gemeinen Kiefer. II. Ueber Wachsfärbung. *JB. Ges. Graub.* xxix, pp. 25-37.

554. PLATEAU, F. Une expérience sur la fonction des antennes chez la *Blatte*. C.R. ent. Belg. 1886, pp. cxviii-cxxii.

Specimens of *Periplaneta orientalis* with antennæ, and others deprived thereof, were confined in a vessel, and it was found that only the former found their way to food. He concludes "chez la *Blatte* les antennes sont les organes olfactifs."

——. [See also MIALl & DENNY.].

555. PLÖTZ, C. System der Schmetterlinge. MT. Vorpomm. xxxvii, pp. 1-44.

A systematic arrangement of *Lepidoptera*, accompanied by characters for the various divisions. He recognizes 43 groups and 100 families.

556. —. Nachtrag und Berichtigungen zu den *Hesperinien*. S. E. Z. xlvii, pp. 83-117. [*Lepidoptera*.]

This supplement contains descriptions of new and recently described species, additional characters for others, and a few remarks on synonymy and variation; a few genera are redescribed. The habitat of several of the new species is unknown.

557. POPPE, S. A. Ein neuer *Smynthurus* aus S.W. Africa. Abh. Ver. Brem. ix, p. 320. [*Neuroptera*.]

558. PORTSCHINSKY, J. *Orthoptera nonnulla nova vel parum cognita*. Hor. Ent. Ross. xx, pp. 111-127, pl. xii.

This paper is entirely in Russian; it apparently includes only 1 new species.

559. POUJADE, —. New *Lepidoptera* from Thibet. Bull. Soc. Ent. Fr. (6) v, pp. cc, ccvii, ccxv, & ccxvi; *op. cit.* (6) vi, pp. xii, xiii, xxii, xcii, cxvi, cxvii, ccxv, cxliii, cli, clix, clxvii, & clxxxviii.

560. POULTON, E. B. Notes in 1885 upon Lepidopterous larvæ and pupæ, including an account of the loss of weight in the freshly formed Lepidopterous pupa. Tr. Ent. Soc. 1886, pp. 137-179.

Contents:—1, Notes upon the larvæ of *Smerinthus tiliæ* and *S. ocellatus*, and upon the red spots in *Smerinthus* larvæ. 2. Further examination of the newly-hatched *Smerinthus* larva. 3. Notes upon the adult larva of *Acherontia atropos*, with suggestions as to its appearance in earlier stages. 4. The relation of the colours of the larva of *Sphinx ligustri* to those of its food-plants. 5. A new point in the terrifying attitude of the larva of *Charocampa elpenor*. 6. The terrifying attitude of the larva of *Dicranura vinula*. 7. The fluid ejected by the larva of *D. vinula*. 8. The apparent failure of the extreme protection of many larvæ. 9. An eversible gland in the larvæ of *Orgyia pudibunda*. 10. The production of a twig-like appearance in the larva of *Hemithea thymiaria*. 11. The darkening of the hairs of the larva of *Acronycta leporina* before pupation. 12. The method by which the imagines of the *Chloephoridæ* escape from their cocoons. 13. Notes upon the larva of *Paniscus cephalotes* parasitic upon the larva of *Dicranura vinula*. 14. Additional note on the distribution of derived plant pigments in certain larvæ. 15. On

the considerable loss of weight in the pupa immediately after throwing off the larval skin. [Abstracts in Am. Nat. xx, pp. 810-814.]

561. [POULTON, E. B.] A further inquiry into a special colour-relation between the larva of *Smerinthus ocellatus* and its food-plants. P. R. Soc. xl, pp. 135-173.

As the result of breeding-experiments and larvæ captured during 1885, he decides that particular variations of colour in larvæ are to a large extent hereditary, and that the colour of the larvæ is influenced by that of the food-plant; "the larva of *Smerinthus ocellatus* maintains a colour relation with the food-plant upon which it was hatched, adjustable within the limits of a single life, and that the predominant colour of the food-plant itself is the stimulus which calls up a corresponding larval colour." [For Summary, vide J. R. Micr. Soc. (2) vi, p. 429, and 1887, p. 226.]

562. PROVANCHER, L. Additions et corrections à la Faune *hymenoptero-logique* de la province de Quebec. Quebec: 1886, pp. 15-164.

Published in connection with Nat. Canad., and contains descriptions of many new species of *Tenthredinidæ*, *Uroceridæ*, *Ichneumonidæ*, and others:

563. —. Petite Faune entomologique du Canada. Cinquième ordre, Les *Hémiptères*, pp. 65-104, pl. ii.

564. PRYER, H. *Lepidoptera* identical to Japan and Great Britain. Tr. A. S. Japan, xiii, pp. 228-235.

Taking 769 as the number of the British, 1110 as the number of the Japanese *Macro-Lepidoptera*, he finds 123 common to the two. There are some general remarks on the climatic conditions affecting *Lepidoptera* in Japan.

565. PUNGUR, J. Adatok egy kevésbbe ismert szöcske-faj természetrajzához. Rov. Lapok, iii, pp. 49-55, & vii-ix, pl. i. [*Orthoptera*.]

Refers to *Pecilimon schmidtii*, Fieb., and is apparently the same as the following.

566. —. Beiträge zur Naturgeschichte einer wenig bekannten Laubheuschreckenart. Math. Nat. Ber. Ung. iv, pp. 78-85, pls. ii & iii. [*Orthoptera*.]

Relates to *Pecilimon schmidtii*; gives some points in its natural history, and describes the structure of the wings and wing-covers in relation to the notes of the Insect: one of the plates is devoted to a representation of its music.

567. PUTON, A. Catalogue des *Hémiptères* de la faune Paléarctique. Troisième édition. Caen: 1886; published with Rev. d'Ent. v, but with separate pagination.

Includes 475 genera, 2138 species of *Heteroptera*, and 137 genera, 1175 species of *Homoptera*; *Aphididæ* and *Coccidæ* being excluded.

568. —. Énumération des *Hémiptères* recueillis en Tunisie en 1883 et 1884, suivie de la description des espèces nouvelles. Exp. sci. de la Tun. Paris: 1886, 24 pp.

12 new species and 1 new genus; the descriptions are by Reuter and Lethierry as well as Puton.

569. QUEDENFELDT, G. Verzeichniss der von Herrn Major a. D. von Mechow in Angola und am Quango-Strom 1878-1881, gesammelten *Buprestiden* und *Elateriden*. B. E. Z. xxx, pp. 1-38, pl. i. [*Coleoptera*.]

64 species, many of them new; contains also a contribution to the classification of the *Chrysobothridae*.

570. —. Neue and seltene Käfer von Porto Rico. *T. c.* pp. 119-128. [*Coleoptera*.]

571. —. Zwei neue *Notoxus* aus Central-Afrika. *T. c.* pp. 133-135. [*Coleoptera*.]

572. —. Verzeichniss der von Herrn Major a. D. von Mechow in Angola und am Quango-Strom 1878-1881, gesammelten *Anthethribiden* und *Bostrychiden*. *T. c.* pp. 303-328, pl. viii. [*Coleoptera*.]

Includes several novelties.

573. RADDE, G. Die Fauna und Flora des südwestlichen Caspi-Gebietes. Leipzig: 1886.

A considerable portion of this work is devoted to Insects. Pp. 89-235 and pl. i give a list, prepared by H. Leder, of many hundred species of *Coleoptera*, the descriptions of novelties being drawn up by Eppelsheim, Reitter, Gänglbauer, and Kraatz. Several species and genera marked as new have, however, been already published elsewhere. Pp. 236-245 contain a list by Christoph, of the *Lepidoptera* of the Talysch region; and pp. 246-254 a list of *Hemiptera*, with remarks by Horvath.

574. RADOSZKOWSKI, O. Faune *Hyménoptérologique* Transcaspienne. Hor. Ent. Ross. xx, pp. 3-56, pls. i-xi.

Extends from *Apidae* to *Chalcididae*, but chiefly occupied with *Aculeata*; two or three new genera and many new species are described; the plates refer almost exclusively to the genitalia, these parts being figured in the case of many of the new species, and also of previously known species.

575. —. Révision du genre *Dasypoda*, Latr. *T. c.* pp. 179-194, pls. xiii-xv. [*Hymenoptera*.]

10 species (2 new) are described at length; the figures relate to the genital armature.

576. RAFFRAY, A. Matériaux pour servir à l'Étude des *Coléoptères* de la famille des *Paussides*. N. arch. Mus. (2) viii, pp. 307-359, pls. xv-xix; and (2) ix, pp. 1-52.

Consists of five parts: 1, Morphology; 2, Classification; 3, Biology and geographical distribution; 4, Description of new species; 5, Synonymic and systematic catalogue. He establishes 1 new genus and 18 new species; the family now consisting of 162 species placed in 12 genera. By an unfortunate arrangement the plates are placed in one volume, their explanation in another.

577. [RAFFRAY, A.] Note sur la dispersion géographique des Coléoptères en Abyssinie et descriptions d'espèces nouvelles. Ann. Soc. Ent. Fr. (6) v, pp. 305-326, pl. vi.

The remainder of memoir No. 264, Titles, *Insecta*, Zool. Rec. xxii. This part continues the descriptions of *Carabidæ*, and a few Lamellicorns.

578. RAGUSA, E. Catalogo ragionato dei *Coleotteri* di Sicilia. Nat. Sicil. pp. 97-102 & 157-160.

Consists of a portion of the *Carabidæ*, and includes 1 new species and two or three varieties.

579. RAILLET, A. Elements de Zoologie Medicale et Agricole. Paris : 1885.

The *Insecta* in this class-book occupy pp. 516-644, and are illustrated with numerous woodcuts.

580. RAYMOND, G. Observations sur l'organisation et les mœurs du *Nematus ribesii*. Mém. Soc. Seine et Oise, xiii, pp. 237-272. [*Hymenoptera*.]

581. REDTENBACHER, J. Vergleichende Studien über das Flügelgeäder der Insecten. Ann. K. K. Nat. Mus. i, pp. 153-232, pls. ix-xx.

Relates to all the orders; the author's object being to establish a nomenclature of the veins of the wings applicable to all the *Insecta*. He calls attention to the unsatisfactory nature of the nomenclature at present in use; discusses the nature and origin of the veins, and describes a large number of wings selected from the various orders, and gives a table of the nomenclature of the veins as used by some of the more important specialists. [Noticed, Wien. ent. Z. v, p. 333.]

582. RÉGIMBART, M. Essai monographique de la famille des *Gyrinidæ*. Ann. Soc. Ent. Fr. (6) vi, pp. 217-272, pl. iv. [*Coleoptera*.]

583. —. *Dytiscides* et *Gyrinides* nouveaux de la collection du Musée de Leyde. Notes Leyd. Mus. viii, pp. 139-144. [*Coleoptera*.]

584. *REHBERG, A. Ueber die Entwicklung des Insectenflügels. Jahresbericht des Königl. Gymnasiums zu Marienwerder 1886. Programm No. 36, S. 1-12, plate. [Cf. Zool. Anz. ix, p. 631.]

Describes development of wing in *Blatta germanica*.

585. REITTER, E. Drei neue *Elmiden* von Sumatra. Notes Leyd. Mus. viii, pp. 213 & 214. [*Coleoptera*.]

586. —. Ueber die *Coleopteren*-Gattung *Dendrodipnis*, Woll., aus Sumatra. T. c. pp. 215-221.

587. —. Drei neue *Chelonarium*-Arten von Sumatra. T. c. pp. 219-221. [*Coleoptera*.]

588. —. Neue *Coleopteren* aus Europa und den angrenzenden Ländern, mit Bemerkungen über bekannten Arten. Deutsche e. Z. xxx, pp. 67-72.

7 new species of *Cerambycidæ* and *Chrysomelidæ*.

1836. [VOL. XXIII.]

589. [REITTER, E.] Revision der mit *Stenosis* verwandten *Coleopteren* der alten Welt. *T. c.* pp. 97-144.

Tabulates the genera, and tabulates and describes all the species, with numerous novelties in *Stenosis* and *Dichillus*. The synonymy is not reproduced in our Record.

590. —. Ueber eine neue europäische *Allecula*. Wien. ent. Z. v, p. 140. [*Coleoptera*.]

591. —. Uebersicht der bekannten *Tapinopterus*-Arten. *T. c.* pp. 170-174. [*Coleoptera*.]

Describes some new species, and separates two old species as new genera.

592. —. Ueber die *Octhebius*-Arten aus der Gruppe des *O. lejolissii*, Muls. *T. c.* pp. 156 & 157. [*Coleoptera*.]

593. —. Beitrag zur Kenntniss der *Coleopteren*-Gattung *Calobius*, Woll. *T. c.* pp. 197-199.

594. —. Beitrag zur Systematik der Grotten-*Silphiden*. *T. c.* pp. 313-316. [*Coleoptera*.]

Gives an improved arrangement of the genera, with one new.

595. —. Ueber die mit *Abraus*, Leach, verwandten *Coleopteren*-Gattungen. *T. c.* pp. 271-275.

Proposes 2 new genera for some Palearctic *Histeridae*.

596. —. Ein neuer *Bythinus* aus Südfrankreich. *T. c.* p. 236. [*Coleoptera*.]

597. —. Sechs neue *Coleopteren* aus Italien, gesammelt von Herrn. Agostino Doderò. Bull. Soc. Ent. Ital. xviii, pp. 30-32.

4 Pselaphidae, 1 Scydmaenid, 1 Scaphidiid, mostly from Sardinia.

— [See also RADDE.]

REUTER. [See PUTON, A. (568).]

598. REY, C. Énumération d'insectes remarquables sous les feuilles malades du tilleul. Ann. Soc. L. Lyon, xxx, pp. 440-442.

Of slight importance.

599. —. Quelques exemples de monstruosités chez les *Coleoptères* et *Hemiptères*. *T. c.* pp. 423 & 424.

600. —. Note sur les premiers états de l'*Anthicus quisquilius*, Th. *T. c.* pp. 425-430, pl. (1 repeated). [*Coleoptera*.]

601. —. Comparaison entre plusieurs larves de divers genres d'*Elaterrides*. *T. c.* pp. 443-446. [*Coleoptera*.]

602. —. Histoire naturelle des *Coléoptères* de France. Suite. *Op. cit.* xxxii, pp. 1-186, pls. i & ii.

This is the completion of the volume on *Hydrophilidae*, the first part of which was recorded last year. The whole work is also published

separately in one volume, with continuous (and different) pagination, and bearing date 1885. The Prix Dollfuss has been accorded by the Entomological Society of France to the author of this work.

603. [REY, C.] Tribu des Brevipennes. Deuxième groupe, *Micropeplides*, pp. 153-171. Troisième groupe, *Stenides*, pp. 173-415, pls. i-iii. *Op. cit.* xxx. [*Coleoptera*.]

Also published separately, with different pagination, as "Histoire Naturelles des Coléoptères de France, *Brevipennes*, *Micropeplides*, *Stenides*" (Paris : 1884). A few new species are described, and in notes some others are briefly characterized and named, in some cases with doubts about their being distinct. These I have recorded, but certain other new names mentioned are not here recorded, as they are apparently intended to apply only to varieties or aberrations.

604. —. Description de deux genres nouveaux de *Tachyporiens*. Rev. d'Ent. v, pp. 252-256. [*Coleoptera*.]

605. RIBBE, C. Beitrag zur Kenntniss der *Lepidopteren*-fauna der Aru-Inseln. CB. Iris, pp. 73-79.

A list of species obtained in twelve months' residence, consisting of 151 species of *Rhopalocera* and 150 of *Heterocera*, accompanied with some remarks on the difficulties of collecting, &c. *Lepidoptera* could not be obtained at night.

606. RILEY, C. V. Report of the Entomologist for the year 1885. Map and 9 pls. Pp. 207-343 of the Annual Report of the Department of Agriculture for the year 1885. Washington : issued June, 1886.

This report deals with silk culture, destructive Locusts, the periodical *Cicada*, *Dermestes vulpinus* and some other injurious Insects, the Locusts of California and the Rocky Mountains, insects injurious to fall wheat (by Webster), the cause of destruction of evergreen and forest trees (by Packard), and experiments in apiculture by McLain.

607. —. Reports of experiments with various insecticide substances, chiefly upon Insects affecting garden crops. Bull. Dep. Agric. Ent. No. 11, pp. 1-34. Washington : 1886.

608. —. Miscellaneous notes on the work of the division of Entomology for the season of 1885. *Op. cit.* No. 12, pp. 1-46, pl. i.

Contains paper by Coquillett on the manufacture of an insecticide called "Buhach" from the flowers of *Pyrethrum cinerariaefolium*; by Packard, on the causes of the destruction of forest trees, with description of 2 new species of *Tortricides*, by Fernald; by Butler, on the periodical *Cicada*; and miscellaneous notes on various Insects.

609. —. The Mulberry Silkworm; being a manual of instructions in Silk-culture. Sixth revised edition, with illustrations. Bull. Dep. Agric. Ent. No. 9. Washington : 1886, pp. vii & 65.

The chief alteration in this edition appears to be a revision of the scale of profits that may be anticipated from silk-production in the United States of North America.

610. [RILEY, C. V.] A carnivorous butterfly larva. Plant-lice feeding habit of *Fenesica tarquinius*. *Am. Nat.* xx, pp. 556 & 557.

It has now been shown that the larva actually eats plant-lice of several species, and will not eat leaves.

RIS, F. [See SCHOCH.]

611. RIVERS, J. J. A new species of Californian *Coleoptera*. *Bull. Cal. Ac. Sci.* ii. pp. 61-63, woodcuts.

Bradycinetus hornii; it stridulates.

612. —. Contributions to the larval history of Pacific coast *Coleoptera*. *T. c.* pp. 64-72.

Some information as to foods and habits.

613. RÖBER, J. Ein neuer Nachtschmetterling von Ceram. *CB. Iris*, p. 40, pl. ii. [*Lepidoptera*.]

614. —. Neue Tagschmetterlinge der indo-australischen Fauna. *T. c.* pp. 45-72, pls. iv. & v. [*Lepidoptera*.]

55 new species, chiefly *Lycænideæ*.

615. RÖDER, V. v. *Dipteren* von den Cordilleren in Columbien. *S. E. Z.* xlvii, pp. 257-270.

A list of species mostly found at an elevation of about 4000 mètres. 12 new species and 3 new genera are described.

616. —. Ueber drei neue Gattungen der *Notacanthæ*. *Ent. Nachr.* xii, pp. 137-140. [*Diptera*.]

617. ROLLETT, A. Untersuchungen über den Bau der quergestreiften Muskelfasern. II Theil. *Denk. Ak. Wien*, li, pp. 23-68, pls. i-iv.

The first part was recorded last year. The second part contains two chapters, headed: iv, on transverse sections of muscles and on nucleolar division in muscular fibres; v, on sheaths of muscles and fibrils.

618. ROSTER, D. A. Cenno monografico degli *Odonati* del gruppo *Ischnura*. *Bull. Soc. Ent. Ital.* xviii, pp. 239-258, pls. ii-vi. [*Neuroptera*.]

619. ROTH, H. L. On the animal parasites of the sugar-cane. London: 1885, 15 pp. and addenda and Index. Manchester: 1886, 4 pp. Reprinted from the "Sugar Cane," 1885 & 1886.

Particulars about a few Insects injurious to the sugar-cane in Queensland, and a list of memoirs relative to Insects, &c., injurious to the plant.

620. RUIZ, M. C. Y. Especies nuevas del Género *Ochrilidia*, Stål. *An. Soc. Esp.* xv, pp. 111-115. [*Orthoptera*.]

2 species from Spain, 1 from Angola.

621. RUDOW, F. Neue *Ichneumoniden*. *Soc. Ent.* i, pp. 6, &c. [*Hymenoptera*.]

This describes many species, but no indication of locality is given. I have presumed that it is Europe.

622. —. Neue *Cryptus*. *T. c.* pp. 107 & 115. [*Hymenoptera*.]

623. [RUDOW, F.] Nonnulli *Pteromalini* a do. de Stefani-Perez in Sicilia lecti. Nat. Sicil. v, pp. 265-268. [*Hymenoptera*.]

8 new species.

624. SABATIER, A. Sur la morphologie de l'ovaire chez les Insectes. C.R. cii, pp. 61-63, 267-269, & 441-443. [For Summary, vide J. R. Micr. Soc. (2) vi, pp. 229 & 230.]

625. SAHLBERG, J. *Lynchia fumipennis* en på Pandion haliaëtus lefvande *Hippoboscid*. Medd. Soc. Fenn. xiii, pp. 149-152. [*Diptera*.]

626. —. En ny art af *Hemipter*-släktet *Aradus* från Ryska-Karelen. T. c. pp. 153-155.

627. —. En ny finsk art af släktet *Scymnus*. T. c. pp. 156-158. [*Coleoptera*.]

628. —. *Deltoctenemis* eine neue Gattung aus der Käferfamilie *Anisotomidae*. Wien. ent. Z. v, p. 87. [*Coleoptera*.]

629. SALLÉ, A. Monographie du genre *Ancistrosoma*. Ann. Soc. Ent. Fr. (6) vi, pp. 465-468, pl. viii. [*Coleoptera*.]

7 species, 2 of them new.

SALVIN, O. [See GODMAN & SALVIN.]

630. SASAKI, C. On the life-history of *Ugimya sericaria*, Rondani. J. Sci. Jap. i, pp. 1-46, pls. i-vi. [*Diptera*.]

Immense loss being occasioned in Japan by this fly, the investigations here described were undertaken in order to find a remedy. The author has ascertained the life-history: the egg being laid on the mulberry-leaves is swallowed by the silkworm, and the larva speedily passes through the walls of the alimentary canal, and ensconces itself in one of the nerve-ganglia, where it feeds on the cells, but after a time leaves this abode and enters the tracheal system, and takes up a position where it can get a supply of fat as food, and plenty of air. A remedy he suggests may be found by taking the food of the silkworm from bushes planted in spots that are not frequented by the fly. The paper also contains many anatomical observations. The plates are satisfactory. The following are the divisions of the memoir:—I. External characters and habits of the adult fly. II. Sexual and other internal organs of the adult fly. III. Development of the maggot. IV. Diseases and symptoms either caused by or concomitant with the presence of the maggot in the silkworm. V. Habits and anatomy of the mature maggot. VI. The pupa and its development into the mature Insect.

631. SAUNDERS, W. Catalogue of Canadian butterflies, with notes on their distribution. Tr. R. Soc. Canad. iii, sect. iv, pp. 85-106. [*Lepidoptera*.]

209 species, including 13 of *Papilio*.

SCHATZ, E. [See STAUDINGER (682).]

632. SCHAUFUSS, L. W. Beschreibung neuer *Pselaphiden* aus der Sammlung des Museum Ludwig Salvator. Ein Beitrag zur Fauna Brasiliens, der Kgl. Niederländischen Besitzungen in Indien und Neuhollands. Tijdschr. Ent. xxix, pp. 241-296, pls. x & xi. [*Coleoptera*].
633. SCHILDE, J. Betrachtungen über die Variabilität in der Schmetterling's-Gattung *Pyrgus*. B. E. Z. xxx, pp. 39-62, pl. ii. [*Lepidoptera*].
Shows that the variation is different in the sexes, and discusses the relation of certain races to climate, elevation, &c., from an anti-Darwinian point of view.
634. SCHLETTERER, A. Ueber die *Hymenopteren*-Gattung *Evania*, Fab. Verh. z.-b. Wien, xxxvi, pp. 1-46, pl. i.
Recognizes 50 species, describing many as new. The descriptions of species unknown to him are reproduced from their authors. The synonymy is given in a catalogue (pp. 39-46), and is not noticed in our systematic pages. The plate gives a few structural details.
635. —. Zwei neue Arten der *Hymenopteren*-Gattung *Evania*. T. c. pp. 231-234.
636. SCHMID, A. Die *Lepidopteren*-Fauna der Regensburger Umgegend mit Kelheim und Wörth. CB. Ver. Regensb. xl, pp. 19-224. 11. *Microlepidoptera*.
Completes this list, and includes one or two new species.
637. SCHMIEDENKNECHT, H. L. O. *Apidae europææ*. Fasc. xii, pp. 977-1071 (completing vol. ii). [*Hymenoptera*].
638. SCHNABL, J. Contributions à la faune diptérologique. Genre *Aricia*. Hor. Ent. Ross. xx, pp. 271-440, pls. xvi-xxi.
Deals with 33 species, 4 being new. The plates represent the genitalia.
639. *SCHNEIDER, J. S. Nordfuglön zoologisk Skizze. Tromsø Museums Aarsberetning for 1884. Tromsø: 1885, Sid. 17-37. (65 sp. *Coleoptera*, 27 sp. *Lepidoptera*; cf. Ent. Tidskr. 1886, p. 30.)
640. SCHOCH, G. *Orthoptera* Helvetiæ analytisch bearbeitet als Grundlage einer *Orthopteren* fauna der Schweiz. Schaffhausen: 1886, 39 pp.
Issued like the following in connection with MT. schw. ent. Ges., with special pagination.
641. SCHOCH, G., & RIS, F. *Neuroptera* Helvetiæ analytisch bearbeitet als Grundlage einer *Neuropteren* fauna der Schweiz. Schaffhausen: 1885.
This is issued as an appendage to MT. schw. ent. Ges.; pp. 1-94, and a plate, are at present published, including *Planipennia* and *Odonata*. The *Odonata* is by Ris.
642. SCHÖNFELD, —. Die physiologische Bedeutung des Magenmundes der Hönigbiene. Arch. f. Phys. 1886, pp. 451-458. [Summary, J. R. Micr. Soc. (2) vi, pp. 965 & 966.]

643. SCHOYEN, W. M. Om forekomsten af Dipterlarver under huden hos Mennesker. Ent. Tidskr. 1886, pp. 171-187.

He considers that the larva of *Hypoderma bovis* is certainly found occasionally under the skin of man in Norway.

644. SCHULTHESS-RECHBERG. Zur Hummelfauna Corsica's. MT. schw. ent. Ges. vii, pp. 272-277. [*Hymenoptera*.]
2 new species.

645. SCHWARZ, E. A. Remarks on N. American *Scolytids*. Ent. Am. ii, pp. 40-42 & 54-56. [*Coleoptera*.]

Includes 1 new species.

646. SCOTT, J. Description of a new genus and species of *Hemiptera-Heteroptera*. Ent. M. M. xxiii, p. 64.

647. SCUDDER, S. H. Systematic review of our present knowledge of fossil Insects, including Myriapods and Arachnids. Bull. U. S. Geol. Surv. xxxi, pp. 1-128.

This is a translation from Zittel's Handbuch der Palæontologie, and will be found very useful, though wanting the figures accompanying the original work.

648. —. The 'oldest' known Insect-larva, *Mormolucoides articulatus*, from the Connecticut river rocks. Mem. Bost. Soc. iii, pp. 431-438, pl. xlv. [*Palæo-entomology*.]

Considered to be nearest allied to *Sialidæ*, though a resemblance to *Coleoptera* is admitted.

649. —. A review of Mesozoic Cockroaches. T. c. pp. 439-483, pls. xlv-i-xlviii. [*Palæo-entomology*.]

A considerable number of new genera and species, chiefly from the English beds, are established, and several previously known fossils are referred to other genera. The amalgamation of the principal nervures of the upper wings is said to be the most important of the points by which these mesozoic forms differ from the Palæozoic Cockroaches, and in this respect they approach the living Cockroaches.

650. —. Description of an Articulate of doubtful relationship from the Tertiary beds of Florissant, Colorado. Mem. Nat. Ac. Sci. iii, pp. 87-90, woodcuts. [*Palæo-entomology*.]

Referred with doubt to *Thysanura*.

— [See also MIALl & DENNY.]

651. SELYS-LONGCHAMPS, —. Odonates nouveaux de Pékin. C.R. ent. Belg. 1886, pp. clxxviii-clxxxiv. [*Neuroptera*.]

Of 6 species received from this locality 5 were new. Four of the novelties are said to be purely Palæarctic.

652. —. Revision du Synopsis des *Agrionines*. Mem. Cour. 8vo, xxxviii, pp. 1-233, sep. pag. [*Neuroptera*.]

It is about twenty-five years since this author published the synopsis of the *Agrionines*, and the revision he now gives comprises many novel-

ties, the number of species of the group having about doubled in the twenty-five years. There are no new genera comprised in this memoir owing to the fact that he published in 1885 a programme of the present revision (*cf.* Zool. Rec. xxii, *Ins.* p. 256), in which the new genera were anticipated; these are now fully described; the characters of all the genera and species being given at length in the present memoir, which, however, deals with only four of the six legions that compose the sub-family.

653. SÉMÉNOW, A. Notice sur quelques *Carabes* russes. Hor. Ent. Ross. xx, pp. 230-235. [*Coleoptera.*]

654. SEMPER, G. Reise im Archipel der Philippinen. Zweiter Theil. Fünfte Band Erste Lieferung. Die Tagfalter *Rhopalocera*, pp. 1-46, pls. A & i-viii. [*Lepidoptera.*]

In this account of the Butterflies of the Philippines, the author describes the species, their distribution in the islands, and the number of examples examined, this in some cases being very large. This first part deals with 50 species; the plates are coloured, and one of them is devoted to the earlier stages. Two pages are given to outline figures illustrating neuration of the genera of *Danainæ* and *Euplaïneæ*. [Reviewed, Ent. Nachr. xii, pp. 380 & 381.]

655. SHARP, D. On New Zealand *Coleoptera*, with descriptions of new genera and species. Tr. R. Dublin Soc. (2) iii, pp. 351-454, pls. xii & xiii.

Preceded by some remarks on the Coleopterous fauna of New Zealand.

656. —. On the *Bruchidæ* of Japan. Ann. N. H. (5) xviii, pp. 34-38. [*Coleoptera.*]

13 species—7 new, and 1 new genus.

657. —. The *Scydmaenidæ* of Japan. Ent. M. M. xxiii, pp. 46-51. [*Coleoptera.*]

15 species, 10 new.

658. —. Description of a new species of the *Coleopterous* genus *Macronotu* from Ceylon. *Op. cit.* xxii, p. 197.

659. —. On some proposed transfers of names of genera. Tr. Ent. Soc. 1886, pp. 181-188.

Relates to des Gozis' paper (252). The writer considers he has made it clear that the changes there proposed are objectionable; that they will not meet with general assent at present, and if they did the assent would not be permanent; and that the retrospective application of nomenclatorial regulations in the interests of justice is not wise. (*Cf.* Proc. Ent. Soc. 1886, pp. xvii & xviii.)

— [See also GODMAN & SALVIN.]

660. SIGNORET, V. Liste des *Hémiptères* recueillis à Madagascar, aux environs de Tamatave en 1885 par le Révérend Père Camboué. Ann. Soc. Ent. Fr. (6) vi, pp. 25-30.

30 species of *Heteroptera* and *Homoptera*, 4 new.

661. SLATER, J. W. On the origin of colours in Insects. P. E. Soc. 1886, pp. xix-xxiii.

Maintains, in opposition to Grant Allen, that predaceous and carnivorous Insects are not inferior in beauty to flower and fruit-haunting groups.

662. —. A question on the relation between Insects and Flowers. *T. c.* pp. liii-lv.

Relates chiefly to odour of flowers.

663. SMITH, H. G. Descriptions of four New Species of Butterflies from Burmah. *Ann. N. H.* (5) xviii, pp. 149-151. [*Lepidoptera.*]

664. —. Description of two new species of *Pieridæ* from Zanzibar. *Ent. M. M.* xxiii, p. 32. [*Lepidoptera.*]

665. SMITH, J. B. A revision of the Lepidopterous family *Saturniide*. P. U. S. Nat. Mus. ix, pp. 414-437, pls. xii-xiv. [*Lepidoptera.*]

Includes only the N. American species, one of which is treated as a new genera. The plates represent venation and the secondary sexual characters.

666. —. *Cosmosoma omphale*. *Ent. Am.* i, pp. 181-186. [*Lepidoptera.*]

Calls attention to a peculiar structure in the abdomen of the male containing a silky or waxy substance; also notices other structural characters.

667. —. Scent-organs in some Bombycid Moths. *Ent. Am.* ii, pp. 79 & 80, woodcut. [*Lepidoptera.*]

Relates to *Leucarcia acraea* and *Pyrrharctia isabella*.

668. —. Ants' nests and their inhabitants. *Am. Nat.* xx, pp. 679-687. A compilation of miscellaneous remarks.

669. SNELLEN, P. C. T. Nouvelle espèce des *Syntomides*, *Lepidoptera Heterocera*. *Notes Leyd. Mus.* viii, p. 1.

670. —. Description de nouvelles espèces de *Lépidoptères Hétérocères* des Indes orientales. *T. c.* pp. 3-23.

* 12 species from Sumatra belonging to various families. Some of them have been published by this author previously, though given here as new.

671. —. Beschrijvingen van nieuwe Oost-Indische *Lepidoptera Heterocera*, met afbeeldingen door J. van Leeuwen. *Tijdschr. Ent.* xxix, pp. 33-50, pls. i & ii.

10 species from Sumatra, of various families, all figured.

672. —. Aanteekening over twee soorten van Noord-Amerikaansche *Lepidoptera*. *T. c.* pp. 136-138.

673. —. *Panagra velhi*, nov. spec. *T. c.* pp. 139-141. [*Lepidoptera.*]

674. —. Beschrijving van *Cyclodes spectans*, Snell., eene nieuwe soort der *Noctuinen* van Amboina. *T. c.* pp. 228-232, pl. viii. [*Lepidoptera.*]

[See also WEYENBERGH.]

675. *SORDELLI, F. Museo entomologico. Le farfalle d'Italia e dei paesi circonvicini. Con 50 tav. cromolit. Milan : 1885, 4to, vi & 470 pp. [*Lepidoptera.*] [*Cf. Zool. Anz.* ix, p. 129.]

676. SORHAGEN, L. Die Kleinschmetterlinge der Mark Brandenburg und einiger angrenzenden Landschaften : mit besonderer Berücksichtigung der Berliner Arten. Pp. x & 368.

A catalogue giving localities and times of appearance. Special attention is paid to the habits of the larvæ, and their mines are described from the author's own preparations. In a review, *Wien. ent. Z.* v, p. 78, is a list of the larvæ described for the first time in this work. [Review, *S. E. Z.* xlvii, p. 187, and by Hinneberg, *B. E. Z.* xxx, pp. 341-345.]

677. SPEYER, A. Ein Beitrag zur Kenntniss der *Psychiden* mit spiralgewundenen Raupengehäusen. *S. E. Z.* xlvii, pp. 325-350. [*Lepidoptera.*]

A discussion as to the specific distinctions of two species, with some remarks of general interest interspersed as to parthenogenesis.

678. SPICHARDT, C. Beitrag zu der Entwicklung der männlichen Genitalien und ihrer Ausführungsgänge bei Lepidopteren. *Verh. Ver. Rheinl.* xliii, pp. 1-34, pl. i.

The method employed was that of longitudinal and transverse sections, mostly mounted in Canada balsam. The species to which the greater part of the investigations refer are *Liparis dispar* and *Smerinthus populi*. He found notable differences in the development of closely allied species, such as *Smerinthus populi* and *ocellatus*. Before tracing the development of the testes, vasa deferentia, and ductus ejaculatorius, he describes these parts in their completed state. [For Summary, *vide J. R. Micr. Soc.* (2) vi, pp. 968 & 969.]

STANTON, H. T. [See BUCKLER.]

679. STANGE, G. *Lepidopterisches.* *S. E. Z.* xlvii, pp. 279-286.

Miscellaneous observations on many species of moths, and description of one novelty. The locality is only mentioned as "here"; but I have presumed some part of N. Germany is intended.

680. STAUDINGER, O. Centralasiatische *Lepidopteren.* *S. E. Z.* xlvii, pp. 193-215 & 225-256.

Descriptions of a large number of varieties and some new species of Butterflies. It is difficult to decide in several cases whether the insects are new or not, and *Col. Hyale* is followed by *Pol. caspius*, and so on, without fuller indication of the genera intended.

681. —. Description of a new *Bombyx* allied to *Arctia caja*. *Ent. M. M.* xxii, p. 258. [*Lepidoptera.*]

682. —, & SCHATZ, E. Exotische Schmetterlinge. [*Lepidoptera.*]

Parts 13-16 of Theil I have been issued, being pp. 103-174, and pls. lxi-lxxx; the latter are far in advance of the text, which extends to *Megistanis*. Part 1 of Theil II, by Schatz, has also been issued, compris-

ing pp. 1-32, and 10 plates; this includes a history of the classification, and an account of Wallace's geographical regions; its plates are devoted to venation, and a few other generic characters.

683. STEFANI, T. DE. Raccolte imenotterologiche sui monti di Renda e loro adiacenze. Nat. Sicil. v, pp. 112, 138, 168, & 181. [*Hymenoptera*.]

A list of 208 species throughout the order, with observations and descriptions of a few new species.

684. STEIN, R. R. v. Tenthredinologische Studien. x Zur Kenntniss der Gattung *Allantus*. Ent. Nachr. xii, pp. 3-9. xi Die Gattung *Cladius*, III. T. c. pp. 22-29 & 33-40. [*Hymenoptera*.]

Completes description of *A. distinguendus*, with a new variety thereof; and discusses the synonymy, &c., of 2 species of *Cladius*.

685. —. Neue Afterraupen. Wien. ent. Z. v, pp. 141-151. [*Hymenoptera*.]

686. ST. GEORGE, V. VON V. LA. Spermatologische beiträge. Arch. mikr. Anat. xxvii, pp. 1-12, xxviii, pp. 1-14.

The first of these relates to *Blatta germanica*, the second to *Coleoptera*. [For Summary, vide J. R. Micr. Soc. (2) vi, pp. 590 & 591, and 1887, p. 70.]

687. STIERLIN, G. Beschreibung neuer Rüsselkäfer-Arten. MT. schw. ent. Ges. vii, pp. 226-230. [*Coleoptera*.]

10 new species from the Mediterranean region.

688. —. Beschreibung einiger neuer Rüsselkäfer. T. c. pp. 282-286. [*Coleoptera*.]

7 new species from Europe.

689. —. *Coleoptera Helvetiæ*. Schauffhausen.

This is the commencement of an analytical work for the determination of the *Coleoptera* of Switzerland. It is issued in connection with M.T. schw. ent. Ges., but with separate pagination. The part issued is pp. 1-32 of vol. ii, *Sternovi*.

690. STUHLMANN, F. Die reifung des Arthropodeneies nach Beobachtungen an Insekten, Spinnen, Myriapoden, und Peripatus. Ber. Ges. Freib. i, pp. 101-228, pls. v-x.

This commences with a summary of the subject, and then gives his own observations on the formation of the egg of many insects of most of the orders. The memoir is chiefly occupied with Insects, the observations on other classes being few, and undertaken merely for comparison. It concludes with a bibliographical list of 183 memoirs on the subject. [Summary in J. R. Micr. Soc. (2) vi, p. 961.]

691. —. Die Reifung des Arthropodeneies. Biol. Centralbl. vi, pp. 397-402.

A summary of the preceding paper in Ber. Ges. Freib. i.

632. SWINHOE, C. On the *Lepidoptera* of Bombay and the Deccan. Part iv *Heterocera*, continued. P. Z. S. 1885, pp. 852-886, pls. lvi & lvii.

This completes the series of papers, and comprises *Geometridæ* to *Pterophoridae*, noticing 216 species, including many novelties. The *Tortricidæ*, *Tineidæ*, and *Pterophoridae* are by Lord Walsingham. For the previous portions of the memoir, cf. Zool. Rec. xxii. *Ins.* Titles (336).

693. —. On the *Lepidoptera* of Mhow in Central India. *Op. cit.* 1886, pp. 421-465, pls. xl & xli.

A list of 253 species, with a considerable number of novelties. The *Tortricidæ* and *Tineidæ* are the work of Lord Walsingham.

694. TARGIONI-TOZZETTI, A. Notizie sommarie di due specie di *Cecidomyidei*, una consociata ad un *Phytoptus*, ad altri acari e ad una *Thrips* in alcune galle del Nocciòlo (*Corylus avellana*, L.), una gregaria sotto la scorza dei rami di Olivo, nello stato larvale. Bull. Ent. Ital. 1886, pp. 419-431, pl. xvi. [*Diptera* and *Thysanura*.]

According to a footnote this is practically a reproduction of a memoir already published in Atti d. R. Acc. dei Georgofili, ser iv, vol. viii, 1886, a periodical I am unacquainted with.

695. TEICH, C. A. *Lepidopterologisches* aus Livland. S. E. Z. xlvii, pp. 168-171.

Relates chiefly to variation ; but has descriptions of 2 new species.

696. THOMAS, FR. Ueber die Mückenblattgalle von *Vitis vinifera* und ihre Unterscheidung von der Reblausgalle. Ent. Nachr. xii, pp. 129-135, 199 & 200.

The observations on the galls of *Cecidomyia ceneiphila* and on those of *Phylloxera* are made with a view of distinguishing the two.

697. * —. Zur Beziehung zwischen Pilzen einer seits und Gallen, sowie Gallmückenlarven andererseits. Irmischia, Correspondenzblatt Bot. Ver. für Thüringen, v, 1885, No. 1. p. 4 (cf. Wien. ent. Z. v, p. 207).

698. THOMSON, C. G. Notes Hyménoptérologiques. Deuxième partie (Genre *Mesochorus*). Ann. Soc. Ent. Fr. (6) v, pp. 327-344.

New subgenera and many new species from Northern and Central Europe.

699. —. Notes Hyménoptérologiques. Troisième partie. Observations sur le genre *Ichneumon* et descriptions de nouvelles espèces. No. 1er. *Op. cit.* vi, pp. 11-24.

Many novelties as well as old species are described, all from Northern and Central Europe.

700. * —. Skandinaviens Insekter. En Handbok i Entomologi till allmänna läroverkens tjänst. Andra omarbetade upplagan. Första häftet. *Coleoptera*. Lund: 1885, 8vo, 186 sid, 5 tafl. (Cf. Ent. Tidskr. 1886, pp. 30 & 128.)

A manual of entomology for use in secondary schools.

701. TICHOMIROFF, A. Die Künstliche Parthenogenese bei Insecten. Arch. f. Phys. 1886, supp. Band, pp. 35 & 36.

Relates to the eggs of *Bombyx mori*; parthenogenesis undoubtedly occurs, and the hatching of parthogenetic eggs can be artificially encouraged. [For Summary, vide J. R. Micr. Soc. 1887, p. 73.]

702. TÖMÖSVÁRY, O. Ujabb adatok hazánk *Thysanura*-faunájához. Math. term. köz. xix, pp. 47-58.

Entirely in the Hungarian language, with the exception of a diagnosis of a new species of *Smynthurus*.

703. TRAIL, J. W. H. A new gall-midge. Scot. Nat. (n.s.) i, p. 250. [*Diptera*.]

704. TRIMEN, R. Notes on Insects apparently of the genus *Margarodes*, Lansd.-Guilding, stated to occur abundantly in the nests of White Ants, and also of true Ants, in certain Western districts of the Cape Colony. Tr. Ent. Soc. 1886, pp. 461-463. [*Rhynchota*.]

705. TRIMEN, R., PERINGUEY, L., & MACOWAN, P. Report of the Phylloxera Commission, Cape of Good Hope. Cape Town: 1886, 31 pp.

In January, 1886, two distinct localities were found to be infested. This report gives the particulars thereof, and an account of the measures adopted to destroy the Phylloxera. No suggestion is made as to the whence or how of its introduction; but it appears there are American vines in cultivation, both in the Cape Colony and Natal.

706. TSCHITCHÉRINE, T. Remarques sur une espèce déjà connue et description d'une espèce nouvelle du genre *Pacilus*, Bon. Hor. Ent. Ross. xx, pp. 242-244. [*Coleoptera*.]

707. TUTT, J. Description of *Crambus cantiellus* mihi, a *Crambus* new to science. Ent. xix, pp. 52-54. [*Lepidoptera*.]

708. *UHLER, P. R. Check-list of *Hemiptera-Heteroptera*. [Cf. Ent. Am. ii, p. 148.]

This N. American list includes 1448 species.

709. —. A new noxious *Capsid*. Canad. Ent. xviii, p. 208. [*Hemiptera*.]

710. VÁNGEL, E. A lepkék szaga (L'odeur des *Lepidoptères*). Rov. Lapok, iii, pp. 13-15.

Relates some experiments, from which he concludes that blinded Insects find their way to their mates by the sense of smell.

711. —. A szüznemzés (Parthenogenesis). T. c. pp. 56-61, ix, & x.

Includes a list of 20 species of Moths, in which parthenogenesis has been observed, 6 of them original.

712. —. Beiträge zur Anatomie, Histologie und Physiologie des Verdauungsapparates des Wasserkäfers *Hydrophilus piceus*. Term. füzetek, x, pp. 190-208, pl. v.

Gives anatomical and histological particulars about the three portions of the alimentary canal, and discusses the glands of the mid-gut; these

he considers excrete a substance similar to that of the pancreas, and that also represents bile. He also discusses the Malpighian vessels, whose function he considers is that of excreting urine.

713. VERRALL, G. H. List of British *Tipulidæ*, &c. ("Daddy Long-legs"), with notes. Ent. M. M. xxiii, pp. 117-125 & 156-160. [*Diptera*.]

Besides the list, this comprises a table for the separation of the genera of *Tipulidæ* and allied families, description of new species, and many remarks on other species.

714. —. A hundred new British species of *Diptera*. *Op. cit.* xxii, pp. 179-182, 199-202, & 230-234.

In addition to the description of several new species, and the record of British novelties, this contains numerous remarks on the synonymy of Walker's *Dipt. Brit.*

715. VIALLANES, H. Études histologiques et organologiques sur les centres nerveux et les organes des sens des animaux articulés. Deuxième mémoire. Le ganglion optique de la libellule (*Æschna maculatissima*). Bibl. haut. études, xxxi, pp. 1-34, pls. i-iii.

716. —. Sur un nouveau type de tissu élastique observé chez la larve de l'*Eristalis*. Ann. Sci. Nat. xvii, Nos. 5 & 6, pl. [*Cf. Zool. Rec.* xxi, *Ins.* p. 259, and *Gazagnaire, Bull. Soc. Ent. Fr.* (6) vi, pp. civ-cvi.]

717. VOGLER, —. Die Tracheenkiemen der Simulien-Puppen. *MT. schw. ent. Ges.* vii, pp. 277-282. [*Diptera*.] [For Summary, *vide J. R. Micr. Soc.* 1887, p. 227.]

718. WAILLY, A. Catalogue raisonné des Séricigènes sauvages connus. *Bull. Soc. Aclim.* (4) iii, pp. 72-101. [*Lepidoptera*.]

The species are arranged geographically, and he gives some particulars on the best mode of rearing the larvæ.

719. WALLENGREN, H. D. J. Skandinavians Heterocer-Fjärilar beskrifne af. Andra delen, Spinnarne. Tredje häftet. pp. 257-444. [*Lepidoptera*.]

Includes *Lithosiidæ* to *Acronyctidæ*. Although the bulk of the work is in the Swedish language, diagnoses are given in Latin of the families, genera, and species, including four new genera for well-known species. There is a short appendix relating to the previous parts of the work.

720. —. Skandinavians arter af *Trichopter*-familjen *Apataniidæ*. Ent. Tidskr. 1886, pp. 73-80. [*Neuroptera*.]

4 species are described, 1 of them new.

721. WALTER, A. Beiträge zur Morphologie der Schmetterlinge. Erster Theil. zur Morphologie der Schmetterlings-mundtheile. *Jen. Z. Nat.* xviii, pp. 751-807, pls. xxiii & xxiv. [*Lepidoptera*.]

The memoir noticed last year, *Zool. Rec. Ins.* (353), is practically a summary of this.

WALSINGHAM. [See SWINHOE (692), (693).]

722. WASMAN, S. J. Ueber die Lebensweise einiger Ameisengäste. Deutsche e. Z. xxx, pp. 49-66.

The habits of several species of beetles are described, as they were observed in ants' nests placed under glass for the purpose. He gives many remarkable and interesting details, and concludes that the relations of ants'-nest beetles to the ants are of a very varied character, *Atemeles* being a true guest, living in the most intimate and friendly relations with its hosts, while *Dinarda* and *Heterius* are treated with tolerance, but indifference, and *Myrmedonia* is an enemy, and treated as such by the ants.

723. WATERHOUSE, C. O. Aid to the identification of Insects. Pts. 26 & 27, pls. 165-172.

724. —. Some observations on the tea-bugs (*Helopeltis*) of India and Java. Tr. Ent. Soc. 1886, pp. 457-460, pl. xi. [*Rhynchota*.]

725. —. A new genus of Heteromorous *Coleoptera*, allied to *Notoxus*. Ann. N. H. (5) xvii, p. 39.

726. —. Characters of undescribed *Coleoptera* in the British Museum. T. c. pp. 497-501.

727. —. Description of a new species of *Sphenophorus*. Op. cit. xviii, p. 318. [*Coleoptera*.]

728. WEISE, J. Naturgeschichte der Insecten Deutschlands. *Coleoptera*, Sechster Band, vierte Lieferung, pp. 569-768. Berlin: Stricker.

This deals with the *Galerucides* and a portion of *Halticides*. Full descriptions of the genera and species are given in addition to analytical tables and much information about variation and larvæ. In *Halticides* most of Foudras's genera are adopted, and *Orestia* is discussed, and referred to this sub-family in spite of the recently expressed opinions of Chapuis and Allard to the contrary. Species other than those of Germany are freely alluded to or described in notes. The synonymy given in this work is not reproduced in our systematic record, except in one or two exceptional cases.

729. —. Vier neue *Pachybrachys*-Arten. Deutsche e. Z. xxx, pp. 21 & 26, pl. [*Coleoptera*.]

Accompanied by a plate representing the male organs of numerous species of *Chrysomelide*, and also by a description of a new *Scymnus*.

730. *WENY, JOH. Die Kolumbaczer Mücke. Im Auftrage des k. ungar. Ministeriums für Ackerbau, Industrie und Handel verfasst von Dr. Edmund Tömösvary. [*Diptera*.] [Cf. Wien. ent. Z. v, p. 239.]

This apparently relates to a German translation of a memoir with plate relating to an uncertain species of *Simulia*.

731. WESTWOOD, J. O. Notice of a tube-making *Homopterous* insect from Ceylon. Tr. E. Soc. 1886, pp. 329-333, pl. viii.

A new insect, residing in peculiar shell-like tube attached to the tulip tree, *Adansonia digitata*.

732. [WESTWOOD, J. O.] Observations upon species of *Curculionida* injurious to *Cycadææ*, especially to plants of the genus *Zamia*. Ann. Ent. Belg. xxx, pp. 125-130, pl. v. [*Coleoptera*.]

733. WEYENBERGH, H. *Lepidopterologische* Fragmenten nagelaten door. Tijdschr. Ent. xxix, pp. 111-124, pls. iii & iv.

Edited by P. C. T. Snellen; who appends explanatory remarks to the descriptions.

734. —. *Dipterologische* fragmenten. *T. c.* pp. 125-133. [*Diptera*.]

These posthumous descriptions are edited by Van der Wulp.

735. WHITEHEAD, C. Official reports on the Hessian fly. Reprinted. J. R. Agric. Soc. (2) xxii, pp. 727-729.

736. WIELOWIEJSKI, H. R. VON. Ueber das Blutgewebe der Insekten. Z. wiss. Zool. xliii, pp. 512-536.

A discrimination of the blood tissues of the body cavity of insects. These he mentions in his summary, pp. 534 & 535, as being chiefly of three kinds—the fat cells or fat bodies, œnocyths, and pericardial cells—but there are also others less conspicuous. He describes, pp. 514 & 515, the œnocyths in larva of *Chironomus* as being four out of a group of five very large cells placed on each side of each abdominal segment. He then describes these blood-tissues in several of the orders of insects, especially in *Diptera* (*Chironomus*, &c.), pp. 513-523; *Coleoptera*, pp. 523-529; and *Hemiptera*, *Hymenoptera*, and *Lepidoptera* more briefly. There are some incidental remarks on the light organs of *Lampyridæ*: in this family the œnocyths are found to be much diminished, and replaced by the peculiar tissue forming the light organs. Of the development and functions of these blood tissues very little is yet known. [Brief Summary, J. R. Micr. Soc. (2) vi, p. 964.]

737. —. Observations sur la spermatogénèse des Arthropodes. Arch. slav. Biol. ii, pp. 28-36.

738. —. Zur Morphologie des Insectenovariums. Zool. Anz. ix, pp. 132-139.

Relates to some differences between his earlier observations and those of Korschelt [*cf.* Zool. Rec. xxii, *Ins.* (172)], and contains important statements on the structure and development of the ovary in several orders of *Insecta*. He classifies the ovaries of insects into three groups, based on the structure of their terminal portions. The discussion is continued by Korschelt [*cf.* 370].

739. WILL, L. Bildungsgeschichte und morphologischer Werth des Eies von *Nepa cinerea*, L., und *Notonecta glauca*, L. Z. wiss. Zool. xli, pp. 311-364, pls. xx-xxii.

This memoir is discussed by Korschelt, and is to a large extent replaced by the author's later memoir on the development of the egg of *Colymbetes*.

740. [WILL, L.] Oogenetische studien. I. Die Entstehung des Eies von *Colymbetes fuscus*, L. *Op. cit.* xliii, pp. 328-368, pls. xiii & xiv.

741. WILLISTON, S. W. *Dipterological notes and descriptions.* Tr. Am. Ent. Soc. xiii, pp. 287-307.

22 new species, and 1 new genus of flies of various families from N. America.

742. —. Catalogue of the described species of S. American *Syrphidæ*. *T. c.* pp. 308-324. [*Diptera*.]

Includes about 300 species and 41 genera.

743. —. On two interesting new genera of *Leptidæ*. Ent. Am. ii, pp. 105-108. [*Diptera*.]

North American, one being also new species.

744. *WINGELMÜLLER, K. Das Anlegen von Käfer- und Schmetterlings-sammlungen. Mit 32 Abbild. Magdeburg: 1885, 112 pp. [*cf.* Zool. Anz. ix, p. 155].

745. WITLACZIL, E. Zur Morphologie und Anatomie der *Cocciden*. Z. wiss. Zool. xlv, pp. 149-174, pl. v. [*Rhynchota*.]

I. Die Verwandlung der *Cocciden*: describes and figures the metamorphoses from observations made on *Aspidiotus nerii*, *zonatus*, and *Leucaspis pini*, dealing with the various stages, and concludes that the metamorphosis, though not a complete one, is an incomplete, approximating very nearly to a complete, one; discusses Schmidt's paper (*Arch. f. Nat.* li) on the development of *Aspidiotus nerii*. II. Haut Absonderungen. Bildung des Rückenschildes der *Cocciden*: brief remarks on the wax glands and structure of the dorsal shield. III. The tracheal system; a few details on, and figures of this. IV. A contribution to the knowledge of the sexual organs and their development, pp. 162-166; gives some information and figures of the internal sexual organs of both sexes, in different stages of the development. V. Brief remarks on the nervous system, brain, suctorial and digestive apparatus. VI. Tracheal system of the *Chermetides* (*Chermes abietes* and *Phylloxera quercus*). VII. The sexual organs of *Chermetides*. VIII. Brief observations on the nervous and nutritive systems of species of *Chermetides*. [For summaries, *vide* J. R. Micr. Soc. (2) vi, p. 433, and Am. Nat. xx, pp. 557 & 558.]

746. —. Der Saugapparat der *Phytophthires*. Zool. Anz. 1886, pp. 10-12. [*Rhynchota*.]

An explanatory note as to certain supposed discrepancies between the writer and Wedde and other authorities; pointing out the existence in certain *Rhynchota* of two separate sets of apparatus for the purpose of imbibition.

747. [WITLACZIL, E.] Die Ausbeute des "Pisani" an *Halobates* während der Erdumsoglung 1882-1885. Wien. ent. Z. v, pp. 177-182 & 231-234. [*Rhynchota*.]

Gives much information, in addition to the description of 2 new species.

748. WOOD, T. On *Bruchus*-infested Beans. Tr. Ent. Soc. 1886, pp. 375-380.

Experiments to ascertain to what extent the germinative power of the beans infested was deteriorated.

749. WOOD-MASON, J. *Phyllothelys*: a remarkable genus of *Mantodea* from the Oriental region. J. A. S. B. liii, pp. 206-210, pl. xii. [*Orthoptera*.]

1 new species.

750. —. Revised synopsis of the species of *Charadodis*, a remarkable genus of *Mantodea*, common to India and Tropical America. T. c. pp. 238-244, 15 woodcuts. [*Orthoptera*.]

WULP, VAN DER. [See WEYENBERGH (734).]

751. WUSTNEI, W. Beitrag zur Insektenfauna Schleswig-Holsteins Zweites Stuck. Schr. Nat. Ver. Schleswig, vi, pp. 27-45. [*Hymenoptera*.]

A list of the *Cephidae*, *Siricidae*, and *Fossoria*. No new species are described, but many varieties are discriminated; there are also some corrections of, and additions to, his previous list of *Tenthredinidae*.

II.—ANATOMY AND PHYSIOLOGY.

1. GENERAL, COMPARATIVE, AND EXTERNAL.

Homologies of *Insecta* with Worms, Nasonow (479).

General anatomy of *Cantharidae*, Beauregard (37); of *Pyrophorus*, Dubois (154); of *Formica rufa*, Bos (73); of *Uginya sericaria*, Sasaki (630).—Of *Orthezia cataphracta*, List (406); of *Aspidiotus nerii*, Lemoine (396); of *Japyx*, *Campodea*, and *Machilis*, Grassi (256, 257); of *Machilis*, Grassi (257); of *Nicoletia*, Grassi (258), Summary of Grosse's paper (1885) on anatomy of *Mallophaga*, J. R. Micr. Soc. (2) vi, pp. 64 & 65.—Summary of Wtlaczil's 1885 paper on anatomy of *Psyllidae*, J. R. Micr. Soc. (2) vi, pp. 431-433.—Anatomy of *Periplaneta orientalis*, Miall & Denny (444).

La morphologie du squelette céphalique des Insectes. Viallanes, Bull. Soc. Philom. (7) x, pp. 84-86. "The head of an insect presents three pre-buccal zoonites, like that of the Crustacean; the first bears the eye, the second the antennæ, the third the labrum."

Trophi of *Lepidoptera*, Walter (721).—Summary of Walter's 1885 paper on morphology of mouth-organs of *Lepidoptera*, J. R. Micr. Soc. (2) vi, pp. 427 & 428.—Structure of mandibles, Meinert (434).—Labrum of *Hymenoptera*, Chatin (120).—Labrum of *Hymenoptera*, Chatin (119).—Tongue of bee, Breithaupt (80).—Organs of suction of *Scatella*, Gercke (242).—Trophi of *Rhynchota*, Wtlaczil (745, 746).—Proboscis of *Hemiptera*, Summary of Wedde's paper (1885), J. R. Micr. Soc. (2) vi, pp. 63 & 64.

Hair and glands of the feet, Dahl (133).—Tarsal suckers, Pero (529).

Elastic tissue, Viallanes (716); Gazagnaire, Bull. Soc. Ent. Fr. (6) vi, p. civ, & (237, 238).

Skin, Minot (454).

Development of wing, Rehberg (584).

Wing-veins: Hagen (271), Redtenbacher (581).—Morphology of *Lepidopterous* wing, Cholodkovsky (122).

- Scent-organs in *Lepidoptera*, Haase (266).—Scent-organs, Smith (667).
 —Odoriferous glands of *Cimex lectularius*, Künckel (382, 383).
 Sting of bee, structure and movements of; J. R. Micr. Soc. (2) vi, p. 427.—The sting in *Melipona*, Jhering (333).
 Sound-producing apparatus of *Cicadas*, Nature, xxxiii, p. 368.
 Light-organs of *Lampyridæ*, Wielowiejski, (736) pp. 525 & 526; of *Elateridæ*, Heinemann (281), Dubois (154).
 Note on the eggs and egg-shells of *Ranatra* and *Nepa*; Korschelt, Ent. Nachr. xii, pp. 306–308.
 Cytodieresis, Carnoy (115).
 Instructions for students for preparation of Insects for dissection, pp. 31–42, pl. iv, Dewitz; Anleitung zur Anfertigung und Aufbewahrung zootomischer Präparate; Berlin: 1886.

2. NERVOUS SYSTEM, ORGANS OF SENSE, AND PSYCHOLOGY.

- Nervous system, Bruce (83); of *Japyx*, Grassi (256); of *Machilis*, Grassi (257); of *Nicoletia*, Grassi (258); of *Periplaneta orientalis*, Miall & Denny (444); of *Orthezia cataphracta*, List (406).—Motor nerves, Gabbi (221).—Nervous system and brain of *Coccidæ* and *Chermatides*, Witlaczil (745).—Sur la structure de la substance ponctuée des Insectes; Bull. Soc. Philom. (7) x, p. 56.—La structure du cerveau des Hyménoptères (*Guêpe*); Viallanes, Bull. Soc. Philom. (7) x, pp. 82 & 83.—Der Sinnes-apparat im Gaumen von *Misolampidius morio*; Kolbe (360).
 Structure and functions of organs of sense; Leydig (399).—Functions of antennæ, Plateau (554).—Eye: Ciacio (123), Patten (525).—Eyes and ocelli, Carrière (116).—Optic ganglion of dragon-fly, Viallanes (715).—Sight, Exner (172).—Exner, ein Mikro-Refractometer, Arch. mikr. Anat. xxv, pp. 97–112.—Physiology of faceted eye and ocelli, Notthafft (489).—Account of Plateau's experiments on vision of Insects, J.B. westf. Ver. 1885, pp. 27–29.—Summary of Viallanes' paper (1885) on optic ganglion of some Dipterous larvæ; J. R. Micr. Soc. (2) vi, pp. 430 & 431.
 Sense of taste, Gazagnaire (240), and Bull. Soc. Ent. Fr. (6) vi, p. lxxix.
 Sense of smell: Graber (253), Lampa (386).
 Packard, Abstract of Kræpelin's paper (1883) on the organ of smell in Arthropods, Am. Nat. xx, pp. 889–894 & 973–975.
 Senses and mental faculties generally, Forel (206, 209).—Psychology: Nicolas (487), Fol (201).—Instinct, Fabre (173); of *Hymenoptera*, Nicolas (487); of bee, Müllenhoff (471).—Memory of *Bombus*, Hoffer (293).
 Grant-Allen's theory on origin of colour-sense criticised, Slater (661).

3. MUSCULAR SYSTEM.

- Of larva of *Ugimya sericaria*, Sasaki (630); of *Orthezia cataphracta*, List (406); of *Periplaneta orientalis*, Miall & Denny (444).
 Muscular histology: Rollet (617), Gehuchten (241); in *Dytiscus marginalis* and bee, Melland, Studies Biol. Lab. Owen's University, i, pp. 226, et seq.

4. ORGANS AND FUNCTION OF NUTRITION.

Alimentary canal of *Machilis*, Grassi (257); of *Nicoletia*, Grassi (258); of *Ugimya*, Sasaki (630); in *Coccidæ* and *Chermes*, Witlaczil (745); Miall & Denny (444).—Œsophagus, Schönfield (642).—Alimentary canal and malpighian vessels of *Hydrophilus*, Vágel (712).—Alimentary canal, malpighian vessels, and salivary glands of *Orthezia cataphracta*, List (406).—Digestive apparatus of *Phylloxera*, Lemoine (395).—Digestive system of *Cantharidæ*, Beauregard (37).—Frenzel's paper (1885) on the mid-gut of Insects and regeneration of epithelium, Summary, J. R. Micr. Soc. (2) vi, pp. 231-233.—Salivary glands: Gazagnaire (239), Knüppel (356).—Mandibular and anal glands of bees and ants, Forel, (206) p. 140.—Uric acid in malpighian tubes, Mac Munn (417).—Blood tissues, Wielowiejski (736).

5. CIRCULATION AND RESPIRATION.

In *Periplaneta orientalis*, Miall & Denny (444).—Dorsal vessel of *Nicoletia*, Grassi (258); of *Machilis*, Grassi (257).—Dorsal vessel and aorta of *Japyx*, Grassi (256).—Heart, Poletajewa (531).—The heart during metamorphosis, Kowalevsky (371).

Tracheal system and dorsal vessel of *Orthezia cataphracta*, List (406).—Respiratory system of *Japyx* and *Campodea*, Grassi (256); of *Ugimya*, Sasaki (630); in *Coccidæ* and *Chermes*, Witlaczil (745); of *Nicoletia*, Grassi (258); of *Machilis*, Grassi (257).—Development of tracheæ, Meinert (433).—Spiral thread of tracheæ, Packard (516).—Tracheal gills of *Simulium* pupa, Vogler (717).—Stigmata of *Fucellia*, Gercke (242).—Respiration of aquatic insects, B. E. Z. xxx, p. ix.—Observations sur la respiration du murier à ses différents états; Bert, C.R. Soc. Biol. (8) ii, pp. 528-530.—The internal air of insects; Peyron, C.R. cii, p. 1339.

6. SEXUAL ORGANS AND EMBRYOLOGY.

Genital organs and embryology of *Japyx* and *Campodea*, Grassi (256).—Male and female organs of *Machilis*, Grassi (257).—Sexual organs of *Nicoletia*, Grassi (258); of *Ugimya*, Sasaki (630); in early stages of *Coccidæ*, Witlaczil (745).—Summary of Cholodkovsky's paper (1885) on the sexual apparatus of *Nematois metallicus*; J. R. Micr. Soc. (2) vi, pp. 61 & 62.

Development of pouch in ♀ of *Parnassius*, Elwes (165, pp. 8-12).—*Papilio machaon*, development in egg, &c.; Goossens, Bull. Soc. Ent. Fr. (6) v, p. clxxxi.—Embryology, Bruce (84), and reprinted, Ann. N. H. (5) xviii, pp. 74-76; Grassi (259).—Embryology of silkworm, Plagniol (552); of *Muscidæ*, Kowalevsky (371); of *Hydrophilus piceus*, Heider (280); of *Periplaneta orientalis*, Miall & Denny (444).—Orientation of embryo, Hallez (274).—Emery reviews Korotneff on embryology of *Gryllotalpa*, and Grassi on that of bee; Biol. Centralbl. v, pp. 689-692.

Elaborate summary of Schneider's (1885) paper on development of reproductive organs; J. R. Micr. Soc. (2) vi, pp. 419-422.—Balbiani's Memoir (1885) on the development of the sexual organs in Insects,

summarised ; J. R. Micr. Soc. (2) vi, pp. 55-57.—Development of male sexual organs, Spichardt (678).

Ovary in various orders, Wielowiejski (738).—Ovaries, &c., of *Tingis*, Göldi (249).—Spermatozoa : Gilson (243), St. George (686).—Spermatogenesis, Wielowiejski (737).—Oogenesis : Bambeke (28), Blochmann (57), Korschelt (369, 370), List (405), Perez (528), and summary, Le Nat. viii, p. 257, Sabatier (624), Stuhlmann (690, 691), Will (739, 740).—♀ sexual organs and oogenesis of *Orthezia cataphracta*, List (406) ; of *Formicidæ* and *Vespidæ*, Blochmann (58).—Sur les cellules nutritives de l'ovaire des insectes ; CR. Ass. Fr. Sci. xiv (1) p. 150.—Parthenogenesis : Boiteau (60), Speyer (677), Tichomiroff (701), Vängel (711) ; in beetles, Will, Ent. Nachr. xii, p. 200 ; Mik, *t. c.* p. 315.—Hermaphrodite ; Ent. Nachr. xii, p. 174 ; of *Parnassius delius*, Elwes, P. Z. S. 1886, p. 22.

7. GENERAL BIOLOGY AND STRAY NOTES.

Biology of *Nematus ribesii*, Raymond (580).

Ants and ants' nest beetles, Wasman (722).

Mimicry : Barrett, Ent. M. M. xxiii, p. 41, Pagenstecher (518, p. 131), Wallace, Nature, xxxiv, p. 333. — Among ants, Emery (170) ; in a Neuropterous Insect ; Johnson, Nature xxxiii, p. 365. — Resemblances between butterflies of different genera, and between butterflies and moths ; Godman & Salvin, Biol. Centr. Am. *Rhop.* i, pp. 402, 415, 423, & 481. — *Vespa orientalis* and *Laphria dizonias* occur in company ; Mik, Wien. ent. Z. v, p. 102.—Ant-like spiders ; Bertkau, CB. Ver. Rheinl. xliii, pp. 66-69.—Mimicry and protection, P. Am. Ent. Soc. xiii, p. iii.—Protection : Hoffmann (295), Barrett, Ent. M. M. xxiii, p. 109 ; in larvæ of *Nymphalidæ*, Müller, W. (476) ; in caterpillars, Packard in Riley Rep., 1885, p. 320.—Variation, heredity ; Dusing (157).—Variability in *Pyrgus* (633).—Phylogeny, Haase (267), Poulton (560) ; of lower insects (*Apterygogenea*, Brauer), note on : Haase, Ent. Nachr. xii, p. 398.

Phylogeny and classification, Emery (166).

Heredity in colour variation ; SB. Ges. Dorp. vii, pp. 363-365.

Coloration of Insects, B. E. Z. xxx, pp. xii-xv.—Coloration and food-plant, JB. westf. Ver. 1885, p. 26.—Physiological processes in pigmentation of larvæ ; cf. Poulton (560).—Additional note on the distribution of derived plant-pigments in certain larvæ ; Poulton, Tr. Ent. Soc. 1886, pp. 168-170.—Coloration of Insects in connection with habits, Slater (661).—Development of coloration in larvæ of *Sphingidæ*, Dusing (157).—Coloration of pupæ, mode of influencing ; P. E. Soc. 1886, p. xlvii.

Maternal care, B. E. Z. xxx, pp. 105 & 106.

Influence of high temperature, note on ; Ent. Nachr. xii, p. 246.

Longevity, M'Neil (455).

Flight in animals, Fuchs (220).

Development of wings of *Coleoptera* on emergence from pupa, Bull. Soc. Ent. Fr. (6) v, pp. cxxvii & cxxviii.

Insects as intermediate hosts of parasites, B. E. Z. xxx, pp. xxviii-xxxi.

Migration of *Eciton hamatum*, W. Müller (477).

Fig insects, Müller (472, 473, 474).

Coupling and fighting of *Lucanus cervus*; use of mandibles: White, P. E. Soc. 1886, p. xl.

"On the considerable loss of weight in the pupa (of *Lepidoptera*), immediately after throwing off the larval skin"; Poulton, Tr. E. Soc. 1886, pp. 170-179.

Luminosity, Dubois (152).—Phosphorescence of *Luciola*, summary of Emery's (1885) paper; J. R. Micr. Soc. (2) vi, pp. 234 & 235.—Luminous larvæ, Ent. M. M. xxii, p. 266, and xxiii, p. 99; in N. Zealand, Ent. M. M. xxii, p. 266.

Galls: Cameron (109), Kieffer (349), Liebel (403), Löw (409), Thomas (696, 697); of *Cecidomyia moravie* on *Lychnis viscaria* figured, Wachtl, Wien. ent. Z. v, pl. iii; of *Cecidomyia taxi*; of *Diplosis* and *Thrips* on *Corylus avellana*, Targioni-Tozzetti (694); of *Lasioptera populnea* on *Populus alba* figured, pl. v, Wien. ent. Z. v; of *Aphidide* on poplars, Lichtenstein (401).—Scottish oak galls; Trail, Scot. Nat. (n.s.) i, pp. 302-307.—Synopsis of Scottish oak-galls, Cameron (110).

Insects and flowers; see Economic.

Monstrosities: Frivaldsky (218); Fairmaire, Bull. Soc. Ent. Fr. (6) vi, p. clxxxix; Kerville, Bull. Soc. Ent. Fr. (6) vi, p. clxxxix; P. E. Soc. 1886, p. xlix; of *Coleoptera*, Ulanowski, Soc. Ent. i, pp. 36, &c.; *Carabus sylvestris*, Ent. Nachr. xii, p. 109; in *Lucanus cervus*, Bull. Soc. Ent. Fr. (6) v. p. exci.—Antennæ of *Leucopholis rorida*, C.R. ent. Belg. 1886, p. cxliii.—Toothed femur in *Apion pallipes*, Ent. M. M. xxii, p. 266.—Antennæ of *Saperda carcharias*, S. E. Z. xlvii, p. 166, woodcut.—Abnormal neurulation in *Hymenoptera*; Saund., Ent. M. M. xxii, p. 184.—Fungi on palpus; pseudo-wing on thorax; Gereke (242).—Albinism in *Lepidoptera*, Gadeau de Kerville (222).

Diseases of insects, Krassiltschik (378).—Bacteriology and insects, Balbiani (22), Forbes (202).

III.—FAUNISTIC AND PALÆONTOLOGY.

This division has been, it is believed, rendered complete in itself: that is to say, anyone wishing to ascertain all that has been published in reference to the faunæ of one of our regions can do so by reference to "Faunistic."

Although each of the twelve regions is complete in itself, this is not the case with the subdivisions; thus, anyone wishing to ascertain all that has been published about the entomological fauna of France should look not only to "France," but must also refer to the memoirs cited under "Collective Europe" and "Palæarctic region." References to the synonymical and systematic changes affecting the species of any region are only partially referred to in this division.

N.B.—In Plötz (556) several species of *Hesperidae* are described, their country being unknown; in the same paper the locality "Aburi" occurs: I do not know where this is, so have not been able to refer these species to their proper places in Faunistic.

*Les animaux cosmopolites. Plateau, Revue de Genève, 1886.

1. ARCTIC AND ANTARCTIC.

Insecta, Becher (38).—Point Barrow, P. E. S. Wash. i, p. 9.

2. INSULAR (INCLUDING NEW ZEALAND) AND MARINE.

Coleoptera found alive on the sea two leagues from shore, in the Straits of Dover. Bull. Soc. Ent. Fr. (6) v, p. exci.

Halobates in Arabian Sea, and in the South Pacific; Witlaczil (747).

Madeira. *Coleoptera*, *Hydrena*, Rey (602).—*Lepidoptera*, Butler (99).

Canary Is. *Insecta*, Bolivar (62).

Cape Verde Is. *Lepidoptera*, Meyrick (442).

Chagos Is. *Insecta*, Bourne, P. Z. S. 1886, p. 331.

Hawaiian Is. *Hymenoptera*, Blackburn & Cameron (55).

Pacific Is. *Hymenoptera*, Cameron (107).—*Heterocera*, Butler (95).

Solomon Is. *Rhopalocera*, Mathew (424).—*Neuroptera*, *Odonata*, Selys (652).

New Pomerania. *Lepidoptera*, Honrath (302); B. E. Z. xxx, pp. x-xii.

New Hebrides and Tonga. *Lepidoptera*, Meyrick (442).

Loyalty Is., near New Caledonia. *Neuroptera*, McLachlan (416).

New Caledonia. *Aradida*, Bergroth (49).

Tonga and Marshall Is., New Hebrides, Fiji, Samoa, Solomon Is., New Britain, Rotumah. *Lepidoptera*, Meyrick (443).

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dinidæ, Stein (685).—*Allantus*, Konow (364).—Island of Spiekerooge, *Aculeata*, Sickmann, Abh. Ver. Brem. ix, pp. 275–281; Bremen, *Aculeata*, Alfken, t. c. pp. 282–284.—Belgium, C.R. Ent. Belg. 1886, pp. vi–x.—Netherlands, *Formicidæ*, Bos (73).—Vosges: *Tenthredo cunyi*, Konow (368).—*Monomorium pharaonis* in Berlin, B. E. Z. xxx, p. iii, & Ent. Nachr. xii, pp. 122–125.—Die Ameisenarten der Mark Brandenburg; Neuhaus, MT. Ver. Frankfurt-a.-O. iv, pp. 268 & 296.—Ants of Heidelberg, Blockmann (59).—Switzerland and the Harz, *Cryptides*, Rudow (622).—Alps, Dalla Torre (134).—Switzerland, *Amasis*, Konow (365).—Silesia, *Bombus*, Z. Ent. Bresl. (2) xi, p. xiii.—Austria, SB. z.-b. Wien, xxxvi, p. 33.—Hungary; Friese, Rov. Lapok, iii, pp. 217–222.—Hungary, North: *Apidæ*, Chyzer, Rov. Lapok, iii, pp. 181–187 & 193–198; *Andrena*, Ent. Nachr. xii, pp. 113–115.—Carinthia, Liegel (404).—Russia, Crimea, *Tenthredinidæ*, Jakowlew (330).

Lepidoptera. Millière (451).—Heligoland, cf. Systematic *Spilosoma zatima* (*Arctiidæ*).—Dorpat: *Catephia alchymista*, SB. Ges. Dorp. vii, p. 290; various, t. c. p. 362.—Netherlands: *Micro-Lepidoptera*, Haar (265); Tijdschr. Ent. xxix, pp. xx, xxi, xxiv, xxvi, xevi, & xevii.—Belgium, *Sphingidæ*, CR. ent. Belg. 1886, p. li, xcxi, & exciii.—Rhine, *Micro-Lepidoptera*, Fuchs (219).—Bingen; Glaser, Ent. Nachr. xii, pp. 105–109 & 116–122.—N. Germany, Stange (679).—Mark Brandenburg, Sorhagen (676).—N.W. Germany, Jordan (334).—Verzeichniss der in der Umgegend von Frankfurt-a.-Oder vorkommenden Microlepidopteren; Kretschmer, MT. Ver. Frankfurt-a.-O. iv, pp. 13, &c.—Frankfurt-a.-O.; *Mon, MT. Nat. Ver. Frank., cf. Zool. Anz. ix, p. 412.—Nachtrag zum Verzeichniss der Bündner Lepidopteren; Killias, JB. Ges. Graub. xxix, pp. 3–24.—Göttingen, Jordan (334).—Westphalia: *Sphinx nerii* and *celerio*, JB. westf. Ver. 1885, p. 26; *E. kühniella*, JB. westf. Ver. 1885, p. 19.—Regensburg, Schmid (636).—Switzerland: Frey (216); Rig, MT. schw. ent. Ges. vii, p. 271.—Basle, *Rhopalocera* and *Sphingidæ*, Verh. Ges. Basel, viii, pp. 127–132.—Hungary; Trencsen, Vangel, Rov. Lapok, iii, pp. 139–145.—Hungary, N.; Hudák, Rov. Lapok, iii, pp. 233–256.—*Schmetterlinge des Lavanthales*, V. Nachtrag; Höfner, JB. Mus. Kärnt. xviii, pp. 52–62.

Diptera. Neuhaus (480).—Mik: *Phæobalia*, (447); *Trichocera*, (448).—Dziedzicki (158).—Dorpat, *Tipulidæ*, &c.; Sintenis, SB. Ges. Dorp. vii, pp. 287 & 361.—Germany, Kieffer, *Cecidomyia* (349).—Mark Brandenburg; Engel, Ent. Nachr. xii, pp. 45–47.—Berlin, see also Systematic, *Ceratopogon crudelis*.—Alps, see also Systematic, *Agromyzidæ Loxocera atriceps*.—Mik, *Drosophila* (450); Pokorny (530).—Austria, SB. z.-b. Wien, xxxvi, p. 34.—Kärnten; Tief, JB. Mus. Kärnt. xviii, pp. 63–73.

Rhynchota. Lichtenstein (401).—Netherlands; Fokker, Tijdschr. Ent. xxix, pp. 297–304.—Belgium: C.R. ent. Belg. 1886, p. xlix; *Pulvinaria vitis*, CR. ent. Belg. 1886, p. cxxxv.—Berlin, *Cicada tibialis*, Ent. Nachr. xii, p. 159.—Verbreitung der Reblaus (*Phylloxera*) im Rheingau, Z. Naturw. lix, pp. 164 & 165.—*Then, F., Katalog der österreichischen Cicadinen. (Separat aus dem Programm des K. K. Theresianischen Gymnasiums in Wien, 1886, pp. 59) [cf. Wien. ent. Z. v, p. 351].—*Bericht über die Verbreitung der Reblaus in Oesterreich, 1883 & 1884 [cf. Zool.

Anz. ix, p. 123].—Dobrudscha, *Heteroptera*; Montandon, Rev. d'Ent. v, pp. 257–264.—Hungary, *Aradides*; Horvath, Rov. Lapok, iii, pp. 153–159.—Styria, *Orthezia cataphracta*, Zool. Anz. ix, pp. 190 & 371, & Ent. M. M. xxii, p. 240.—Bohemia, Duda (155).—Galicia, Sprawozd. Kom. fizyjogr. 1886, ii, pp. 122–153.

Neuroptera. Vosges; McLachlan, Rev. d'Ent. v, pp. 123 & 124.—Bonn, *Psocidæ*, SB. Ver. Rheinl. xliii, p. 68.—Rhine, *Ascalaphus meridionalis*; Glaser, Ent. Nachr. xii, p. 76.—Switzerland, Schoch (641).—Black Forest, MacLachlan (415).—Berlin, *Mantispa styriaca*, Ent. Nachr. xii, p. 159.—Liste der in Westfalen gefundenen *Odonata*; Kolbe, JB. Westf. Ver. 1885, p. 55.—Wallis, Liniger, MT. schw. ent. Ges. vii, p. 294.—Hungary, *Thysanura*, Tömosvary (702).

Orthoptera. Löw (409).—Belgium, C.R. ent. Belg. 1886, p. exciii.—Switzerland, Schoch (640).—Galicia, Sprawozd. Kom. fizyjogr. 1886, ii, pp. 153–157.

(f.) *France.*

Coleoptera. Barbier (29), Flack (197), Gozis (252), Stierlin (688).—*Carabidæ*, Deutsche c. Z. xxx, pp. 215–218.—*Bembidium inustum* and *Olisthopus anomalus*, Bull. Soc. Ent. Fr. (6) vi, p. xlv; see also Systematic, *Carabus auratus*.—Rey: *Hydrophilidæ* (602); *Staphylinidæ* (603).—Reitter, *Bythinus* (596).—*Bythinus fauconneti*, n. sp., Fauvel (189).—*Scydmaenus*, Bull. Soc. Ent. Fr. (6) vi, p. xxix.—*Histeridæ*, Rev. d'Ent. v, pp. 152–213.—*Saprinus specularis*, Bull. Soc. Ent. Fr. (6) vi, p. clxiv.—*Melolontha fullo*, Feuille. Nat. xv, p. 39.—*Buprestidæ*, Bull. Soc. Ent. Fr. (6) vi, p. cxxxiii.—*Lacon crenicollis*, Bull. Soc. Ent. Fr. (6) vi, p. lxxxiii.—*Corymbites angustulus* and *Elatér rubidus*, Bull. Soc. Ent. Fr. (6) v, p. cxvii.—*Telephorides*, Bourgeois, Faune gal.-rhen. pp. 101–132.—*Lio-phlæus*, Gozis (252).—at Rallot, Bull. Soc. L. Norm. vii, pp. 84–86; Amiens, Carpentier, t. c. pp. 228–231, &c.; Delaby, t. c. pp. 244–250, 277–279, & 361–367.—Seine, Bedel (40).—Baie de Somme, Bull. Soc. Ent. Fr. (6) vi, p. cxlviii.—Finistère, Bull. Soc. Finistère, viii, sep. pag., pp. 17–64.—Bordeaux, Act. Soc. L. Bord. xxxix, pp. xv, xxiii, xxix, xli, & xlix.—Auvergne, Fauvel (191).—Mont-Dore, Le Nat. viii, pp. 195, &c.—Beziers, Feuille. Nat. xv, pp. 75, &c.

Hymenoptera. Thomson (698).—*Cleptes putoni*, Buysson (102).—*Tenthredinidæ*, Lethierry (398).

Lepidoptera. Brown (87).—*Sphingidæ*, Bull. Soc. Ent. Fr. (6) vi, p. lv.—Abundance of *Sphingidæ* in France in 1885; Bull. Soc. Ent. Fr. (6) v, pp. ccxv & ccxxvi.—*Nemeophila metelkana*, Bull. Soc. Ent. Fr. (6) vi, pp. liv & cxv.—*Erastria venustula*, Hb., Bull. Soc. Ent. Fr. (6) vi, pp. xciii & xciv.—Rheims, Bull. Soc. Ent. Fr. (6) vi, p. clxxxii.—Eure; Dupont, Feuille. Nat. xvi, pp. 70 & 71.—Dep. du Var. *Sphingidæ*, Le Nat. p. 198.—Haute-Garonne; Aubuisson, Bull. Soc. Toulouse, xix, pp. 205–216.—Bordeaux, Act. Soc. L. Bord. xxxix, pp. x, xxxii, & xxxviii.—Vertheuil, Act. Soc. L. Bord. xl, pp. xxiv–xxvi.—Pyr. Or. (novelties); Oberthur, Bull. Soc. Ent. Fr. (6) vi, p. clxvi (see also Systematic, *Coleophora amethystinella*).—Larvæ of *Micro-Lepidoptera*, Lafaury (385).

Diptera. Bigot, *Tanypezidi* (53).

Rhynchota. *Heteroptera* of Calvados, Rev. d'Ent. v, p. 203.—*Typhlocyba aurovittata*, Rev. d'Ent. v, p. 230 (see also Systematic, *Aphis tamaricis*).

Neuroptera. Paris, *Phryganeidæ*, Bull. Soc. Ent. Fr. (6) vi, p. cxiii.—Fontainebleau, *Mantispa*, Bull. Soc. Ent. Fr. (6) vi, p. cxxxiii.—Cent. France, *Calamoceras*; MacLach., Ent. M. M. xxiii, p. 38.—Champrosay, Bull. Soc. Ent. Fr. (6) vi, p. clxxv.—Dept. of Indre, *Odonata*; Martin, Rev. d'Ent. v, pp. 231–251.—Vernet, *Dilar*, *Ascalaphus*, Ent. M. M. xxiii, p. 91 (see also Systematic, *Termes lucifugus*).

Orthoptera. Rheims, *Mantis religiosa*, Bull. Soc. Ent. Fr. (6) vi, p. clxxii.—Paris, Bull. Soc. Ent. Fr. (6) vi, p. clxxv.—Auvergne; Finot, Rev. d'Ent. v, pp. 316 & 317.

(g.) *Southern Europe and Mediterranean Basin.*

Insecta. Sardinia, Costa (130, 131, 132).—Island of Ustica, Nat. Sicil. v, pp. 85–91.—Spain and North Africa, Martinez, Act. Soc. Esp. xv, pp. 48–55.—Western Sahara, Bolivar (61).—Italy (fossil) Omboni (506).

Coleoptera. Reitter (588), Jakowleff (329), Rey (603), Stierlin (687), Weise (728).—Ganglbauer, *Hadrocarabus* (228).—Reitter, *Tapinopterus* (591).—Regimbart, *Gyrinidæ* (582).—Fauvel, *Staphylinides* (188).—Reitter, *Octhebius* (592).—*Calobius*, *id.* (593).—Lewis, *Dendrophilus championi*, Wien. ent. Z. v, p. 280.—Borre, *Scarabaidæ* (70).—Faust, *Curculionidæ* (184).—(cf. also Systematic, *Carabus scabriusculus*, *Julistus constrictus*, *Pimelia scabricollis*).—Spain, *Tenebrionidæ*, CR. ent. Belg. 1886, pp. liv & lv.—Gorritz, Ensayo para la Monographia de los Coleopteros Meloidos indigenos, Saragossa, 1882.—Murcia, CR. ent. Belg. 1886, p. xciv.—Portugal, Stierlin (688).—Italy, Fiori (195).—Matthews, *Corylophidæ* (425, 426).—Sardinia and Italy, Reitter (597).—Sicily, Ciofalo (125), Ragusa (578), and Nat. Sicil. pp. 119 & 205.—N. Africa; Heyden (290).—Catalogue N. African *Staphylinidæ*, Fauvel (187); (see also Systematic, *Carabidæ*, *Carabus scabriusculus*, and *auratus*).—Algeria, L'Abèille, *Chrysomela* (420); (see also Systematic, *Buprestidæ*, *Agrilus limoniastri*; *Anthicidæ*, *Anthicus cyanipennis*; *Bruchidæ*, *Bruchus leprieuri*; *Chrysomelidæ*, *Cryptocephalus abdominalis*).—Greece, Ganglbauer (225).—*Carabidæ*, Kraatz (375).—Greece and Crete, Oertzen (493).—Crete, Jacoby (325).—Salamis, Feuille. Nat. xv, p. 125.—Syria, *Typhloponemys*, *Tachyporides*, Rey (604).—*Bruchidæ*, Baudi (35).—Asia Minor, Heyden (288).

Hymenoptera. Mocsáry (458), Stefani (683), Rudow (623), and Nat. Sicil. vi, p. 9.—Radoszkowski, *Dasypoda* (575).—Kohl, *Pompilidæ* (353).—Cameron, *Tenthredinidæ*, Cameron (107), Magretti (418).—Kirby, *Macrophya* (353).—Corsica, *Bombus*, Schulthess (644).—Italy, Costa, *Salix* (129).—Lombardy, Magretti, *Pompilides* (419).—Dalmatia, Schletterer (635), Gasperini (236).—*Gasperini Noticie sulla Fauna Immenotterologia Dalmatta; i. Apidæ et Diptoptera. Estratto dall' Annuario dalmatico anno iii. Zara: 1886, 30 pp. (cf. Wien. ent. Z. v, p. 336).—Greece, *Amasis*, Konow (365).—Greece and Crete, Forel (205).—Albania, *Tenthredinidæ*, Kirby (352).

Lepidoptera. Leech (393), Millière (451, 453), Sordelli (675) (see also Systematic, *Bucculatrix albiguttella*, *Micropteryx berytella*).—Alpes Mari-

times, Millière (452).—Sicily, Nat. Sicil. p. 249.—Italy, see Systematic, *Psilothrix*.—Spain, see Systematic, *Cledeobia oculatalis*.—Gibraltar, Ent. M. M. xxiii, p. 162.—Algeria, Baker, Ent. M. M. xxii, pp. 250–255; Bull. Soc. Ent. Fr. (6) vi, pp. clxxv & clxxvi (see also Systematic, *Noctuidæ*, *Noctua variicollis*, *Gelechiidæ*, *Amblypalpis*).

Diptera. *Empis*, Gercke (242). Spain, Bigot, *Tanypezidi* (53).—Sicily, Aloï (5).—Italy, Targioni-Tozzetti (694).

Rhynchota. Spain, CR. ent. Belg. 1886, p. 1.—Sicily, Nat. Sicil. vi, pp. 33–36 & 38.—Catalogue of *Rhynchota* of Pavia; Carlini, Bull. Soc. Ent. Ital. xviii, pp. 97–142.—Illyria, Montandon (462).—Tunis, Puton (568).

Neuroptera. Italy, Targioni, *Thysanura* (694).

Orthoptera. Bonnet (63).—Spain, Pantel (520), Ruiz (620), Bolivar, Act. Soc. Esp. xv, pp. 36–38.—Catalogue of *Orthoptera* of Sicily; Riggio & Pajno, Nat. Sicil. vi, pp. 23 & 43.

(h.) *Caucasus and Western Asia.*

Insecta. Central Asia, S. E. Z. xlvii, pp. 300–303 & 323.

Coleoptera. Faust (179, 180); Ganglbauer (226, 227, 233); Radde (573); Reitter (588); Sémenow (653); Stierlin (687).—Ganglbauer *Carabus* (234).—*Æsalus*, Ganglbauer (230).—Kraatz, *Cetoniidæ* (377).—Jakowleff, *Sphenoptera* (329).—Baudi, *Bruchidæ* (35).—Ganglbauer, *Cerambycidæ* (231).—Persia, Kerremans, *Buprestidæ* (346).—Turkestan, Heyden (286); Tschitchérine (706); Deutsche e. Z. xxx, p. 277.—Haury, *Carabus* (278).—Cent. Asia, Faust (185).—W. Asia, Pamir, Ganglbauer, *Carabus* (234).—Cent. Asia, Thibet, Faust, *Curculionidæ* (186).

Hymenoptera. Radoszkowski (574).—Morawitz, *Apidæ* (468); *Tenthredinidæ*, Konow (364, 365).

Lepidoptera. Radde (573).—Vorläufiges Verzeichniss der Schmetterlinge aus der Umgegend von Novorossiisk am Schwarzen Meere im Caucasus; Baillon, Bull. Mosc. lxii, pp. 241–290 (413 spp.).—Bohatsch Beitrag zur Lepidopteren fauna Transkaukasiens; Wien. ent. Z. v, pp. 123–128 & 200–203.—Elwes, *Parnassius* (165).—Cent. Asia, Staudinger, *Rhopalocera* (680).

Rhynchota. Radde (573).

4. AFRICA (ETHIOPIAN REGION).

Insecta. Alluaud (4), Bolivar (61).—Field notes at Suakin; Manders, Ent. M. M. xxii, pp. 277–279.—Western Sahara (see Mediterranean).

Coleoptera. Ancy (6), Bates (32), Dohrn (145), Faust (183), Harold (277), Lansberge (390), Kolbe (362), Quedenfeldt (572), Reitter (589).—Camaroons, Aurivillius (15).—Obock, Fairmaire (174).—Abyssinia, Raffray (577).—Kolbe, *Tefflus* (361).—Regimbart, *Gyrinidæ* (582, 583).—Raffray, *Paussides* (576).—Poll, *Paussidæ* (534).—Marseul, *Histeridæ* (421).—Poll, *Cetoniidæ* (536).—Kraatz, *Cetoniidæ* (376).—Kerremans, *Buprestidæ* (346, 347, 348).—Quedenfeldt, *Buprestidæ* and *Elatridæ* (569).—Olivier, *Lampyrides* (498).—Quedenfeldt, *Notoxus* (571).—Aurivillius,

Curculionidæ (16).—Faust, *Curculionidæ* (184).—Pascoe, *Curculionidæ* (522).—Aurivillius, *Longicornia* (18).—Pascoe, *Cerambycidæ* (523).—Waterhouse, *Sternotomis* (726).—Jacoby, *Chrysomelidæ* (327).—Lefèvre, *Chrysomelidæ* (394).—Jacoby, *Galerucidæ* (324).—Fowler, Zanzibar, *Languria* (213) (see also Systematic, *Sternocera campanæ* and *Eumolpides*, *Dicolectes*).

Hymenoptera. Forel, *Formicidæ* (206); Emery, *Formicidæ* (168).—Kohl, *Pompilidæ* (358).—Schletterer, *Evania* (634).—Kirby, *Chalcididæ* (352).

Lepidoptera. Dewitz (140); Snellen (673); Wailly (718).—Somali, Butler (91).—*Rhopalocera*: Dewitz (139); Holland (296); Staudinger (682).—Zanzibar, Smith, *Pieridæ* (664).—Butler, *Terias* (98).—Butler, *Teracolus* (94).—Butler, *Lycaenidæ* (92).—Plötz, *Hesperiidæ* (556).—Druce, *Heterocera* (151).—Snellen, *Zygænidæ* (669).—See also Systematic, *Papilionidæ*, *Papilio rex*, and *laboranus*.

Diptera. Bigot, *Tanypezidi* (53).—Karsch (336, 339, 340).—Mik, *Drosophila* (450).—Cape of Good Hope, see Systematic, *Bombyliidæ*, *Peringueyimyia*.

Rhynchota. Trimen (704, 705).—*Phylloxera* at Cape Good Hope; Bull. Soc. Ent. Fr. (6) vi, p. xc.

Neuroptera. Selys (652).—Hagen, *Nemopteridæ* (272).—Peppe, *Thysanura* (557).

Orthoptera. Ruiz (620), Karsch (341).—Obock; Bonnet, Le Nat. viii. p. 379.—Karsch, *Mecopoda* (338); *Dermaptera* (337).

5. MADAGASCAR, MASCARENE ISLANDS, SEYCHELLES.

Coleoptera. Fairmaire (175).—Fleutiaux, *Cicindelidæ* (199).—Poll, *Eucamptognathus* (533).—Régimbart, *Gyrinidæ* (582).—Raffray, *Paussidæ* (576).—Lansberge, *Drepanognathus*, (390).—Faust, *Curculionidæ* (184).—Pascoe, *Cerambycidæ* (523).—Gorham, *Endomychidæ* (251).—Madagascar and Mayotte, Pascoe (522).—Mayotte and Grande-Comore, Bull. Soc. Ent. Fr. (6) v, p. cxvi.

Hymenoptera. *Formicidæ*, Forel (204, 206).

Lepidoptera. *Rhopalocera*, Grandidier (255), Staudinger (682), Butler (91).—*Terias*, Mauritius, Butler (98).—Camboué, *Borocera* (105).—Mauritius, Meyrick (443, p. 261).—Reunion, Meyrick (442).

Diptera. *Tanypezidi*, Bigot (53), Karsch (335).

Rhynchota. Signoret (660).

Orthoptera. *Dermaptera*, Karsch (337).

6. TROPICAL AND EASTERN ASIA AND JAPAN.

Manchuria (see also N. Europe and Siberia). Thibet (see also Europe, Western Asia).

Insecta. Tonkin, Blanchard, C.R. cii, pp. 791 & 792.

Coleoptera. Albers (3), Harold (277).—Fleutiaux, *Cicindelidæ* (199).—Kraatz, *Carabidæ* (374).—Morawitz, *Carabides* (469).—Régimbart, *Gyrinidæ* (582), Fauvel (190).—Raffray, *Paussidæ* (576).—Poll, *Cetoniidæ*

(537).—Lansberge, *Coprides* (388).—Borre, *Ectinohoplia* (69).—Olivier, *Pyrocalia* (499).—Faust, *Curculionidæ* (184).—Baly, *Galerucidæ* (25, 26).—Fowler, *Languriidæ* (212).—Gorham, *Endomychidæ* (251).—Jacoby, Aden, *Lactica* (327).—Arabia, Quedenfeldt (572).—India, Reitter (589).—*Curculionidæ*, Faust (181) (see also Systematic, *Cicindelidæ*, *Cicindela dolens*).—Poll, Assam, *Leiochrinus* (545).—*Languriidæ*, Fowler (211).—Tonquin (see also Systematic, *Lampyrides*, *Pyrocalia*).—Ceylon, Waterhouse (725, 726).—Ceylon, *Geodephaga*, Bates (31); *Pselaphidæ*, Schaufuss (632); Sharp, *Macronota* (658); Jacoby, *Galerucinae* (326).—China, Fairmaire (176, 177); Kraatz, *Carabidæ* (373); Heyden (287); Dohrn, *Paussidæ* (146); (see also Systematic, *Aphrodisium*, *Cerambycidæ*).—Pekin, Heyden (289).—Korea, Ganglbauer (232).—Korea and Japan, Kolbe (360).—Japan, Sharp, *Scydmanidæ* (657).—Lewis, *Brathinus* (400).—Sharp, *Bruchidæ* (656).—Jacoby, *Chrysomelidæ* (323).—Mongolia, Stierlin (687).—Thibet (see Systematic, *Leptomorpha prolongata*).—Kashgar, Faust, *Curculionidæ* (181).

Hymenoptera. Japan and Ceylon, Cameron (107).—Forel, *Formicidæ*, (206, 208).—Thibet, Morawitz, *Apidæ* (469).—Indian hive bees, Douglas (149).—Ceylon, Schletterer, *Evania* (634).

Lepidoptera. Butler (92), Oberthür (491, 492); Mergui, Moore (464).—Thibet, Poujade (559).—*Rhopalocera*, Doherty (147, 148).—Thibet and China, Frivaldszky (217), Nicéville (482, 483, 484), Rüber (614), Smith (663), Staudinger (682).—Plötz, *Hesperiidæ* (556).—Elwes, *Parnassius* (165).—Butler, *Terias* (98).—*Delias belladonna*, &c., Ann. N. H. (5) xvii, pp. 157–161. —Butler, *Milionia* (100).—Staudinger, *Arctia cajula* (681).—Wailly (718).—Aden, Butler (91).—India: Aitken (2); Young, Ent. M. M. xxiii, pp. 102 & 103; Swinhoe (693); Swinhoe & Walsingham (692).—India: Butler, *Heterocera* (101); Moore (465).—*Lepidoptera* in the Sikkim Himalaya; Elwes, Nature, xxxiv, p. 597. —Burma, Butler (96).—Distant (142, 143, 144).—Ceylon, Moore (463).—Japan, Butler, *Noctuidæ* (97).—Mantchuria, see Systematic, *Sphingidæ*, *Smerinthus michaelis*.

Diptera. *Tanypezidi*, Bigot (53).—Osten-Sacken (507).—Ceylon, see also Systematic, *Anthomyidæ*, *Diplogaster*.—Japan, see also Systematic, *Strongyloneura*.

Rhynchota. Atkinson (13), *Coccidæ* (14).—Bergroth, *Aradidæ* (49).—*Helopeltis*, Waterhouse (724).—Ceylon, Westwood (731).

Neuroptera. MacLachlan (414).—Indian *Odonata*, Kirby (351).—Selys, *Agrionines* (652).—Pekin, *Odonata*, Selys (651).

Orthoptera. Wood-Mason, *Mantidæ* (749, 750).—Ceylon, *Mecopoda*, Karsch (338).

7. ASIATIC ARCHIPELAGO AND PAPUA.

Coleoptera. Regimbart, *Gyrinidæ* (582).—Rey, *Tachyporides* (604); Schaufuss, *Pselaphidæ* (632); Reitter, *Chelonarium* (587), *Dendrodipnis* (586); Lansberge, *Scarabæidæ* (391), *Coprides*, (388).—Poll, *Cetoniidæ* (537).—Olivier, *Pyrocalia* (499).—Eichhoff, *Scolytidæ* (164).—Baly, *Galerucidæ* (25, 26).—Jacoby, *Galerucidæ* (326).—Baer, Philippines, Catalogue of *Coleoptera* (21).—Fauvel, Philippines, *Staphylinidæ* (190).—

Waterhouse, Philippines, *Sphenophorus* (727).—Fowler, Philippines, *Languriidæ* (213).—Jacoby, Java, *Halticidæ* (323).—Java, Borneo, Waterhouse (726).—Sumatra, Tijdschr. Ent. xxix. p. xxxii.—Sumatra, *Halipus*, &c., Regimbart (583).—Reitter, *Parnidæ* (585).—Olivier, *Lampyrides* (498).—Marseul, Sumatra, *Anthicidæ* (421).—Lansberge, *Cerambycidæ* (389).—Poll: *Batoceridæ* (547); *Neopharsalia* (546).—Pascoe, Borneo and Sumatra, *Cerambycidæ* (523).—Fowler, Borneo, *Languriidæ* (212).—Fleutiaux, Sumbawa, *Cicindelidæ* (199).—Sumbawa, see also Systematic, *Cicindela sumbawæ*.—Harold, Sumatra and Papua (277).—Macleay, New Guinea (411).—Poll, Aru Islands *Buprestidæ* (543).
Hymenoptera. Kohl, *Pompilidæ* (358).—Forel, *Formicidæ* (206).—Kirby, *Chalcididæ* (352).

Lepidoptera. Pagenstecher (518).—*Rhopalocera*: Guillemard (263), Röber (614), Staudinger (682).—Plötz, *Hesperiidæ* (556).—Snellen, *Noctuides* (674).—Semper, Philippines (654).—Heylaerts, Java and Sumatra, *Psychidæ* (291, 292).—Snellen, Sumatra (670, 671).—Butler, Borneo, *Milionia* (100).—Borneo, Sumatra, Tondano, *Terias*, Butler (98).—Pagenstecher, Ceram (519).—Röber, Ceram, *Agarista* (613).—Honrath, Celebes (303, 304).—Capronnier, Waigiou (114).—Honrath, New Guinea (302).—Meyrick, New Guinea (438, 442).

Diptera. Bigot, *Tanypezidi* (53).—Java, see also Systematic, *Tachinidæ*, *Crossotocnema*, and *Muscidæ*, *Synamphoneura*.—New Guinea, see also Systematic, *Leptidæ*, *Macellopalpus*.

Rhynchota. Waterhouse, Java, *Helopeltis* (724).—Bergroth, Java, Philippines, *Aradidæ* (49).

Neuroptera. Selys (652).

Orthoptera. Karsch, Amboyna (342).

8. AUSTRALIA AND TASMANIA.

Coleoptera. Masters, Catalogue of Australian Col. (423).—Harold (277).—Olliff, *Staphylinidæ* (500).—Schaufuss, *Pselaphidæ* (632).—Olliff, *Trogositidæ* (501).—Macleay, *Diphucephala* (412), *Liparetrus* (413).—Olliff, *Nascio* (503).—Poll, *Nascio* (541); *Astræus* (542).—Olliff, *Ptinidæ* (502).—Poll, *Gnostidæ* (544).—Faust, *Curculionidæ* (184).—Pascoe, *Cerambycidæ* (523).—Poll, *Bimia* (548); *Batoceridæ* (547).—Baly, *Galerucinae* (25).—Jacoby, *Galerucinae* (326).—Jacoby, *Halticidæ* (324).

Hymenoptera. Kohl, *Pompilidæ* (358).—Schletterer, *Evania* (634).—Kirby, *Chalcididæ* (352).

Lepidoptera. Guest (262), Meyrick (443).—Butler, *Terias* (98).—Olliff, *Chrysophanus* (504).—Butler, *Heterocera* (95).—Meyrick, *Heterocera* (439).—Kirby, *Sphingidæ* (350), Swinhoe, *Botys astura* (692, p. 872).—Meyrick, *Thalassodes* (438); *Ecophoridæ* (437); *Pterophoridæ* (442) (see also notes on synonymy of Australian *Lep.*, described by Mr. Rosenstock; Meyrick, Ann. N. H. (5) xvii, pp. 528-530.—Thursday Island, Ent. xix, pp. 33 & 84 (from P. Linn. Soc. N.S.W.).

Aphaniptera. Olliff (505).

Rhynchota. Bergroth, *Aradidæ* (49).

Neuroptera. Selys, *Agriionines* (652).

9. NORTH AMERICA.

Insecta. Estimated number (25,132) of the described species of N. American Insects; Ent. Am. ii, p. 158.—Riley (606), Godman & Salvin (247, in various places).—Fletcher, Injurious insects (198).—Dimmock's list of "The insects of *Betula*, in N. America, reproduced"; S. E. Z. xlvii, pp. 172-176.—Fossil, Scudder (648, 650).

Coleoptera. Casey (117, 118), Horn (305, 306, 307), and P. Am. Ent. Soc. xiii, pp. vii-xvi.—Found in dead trunks of *Tilia americana*; Townsend, Canad. Ent. xviii, pp. 65-68.—Comparison of Catalogues of N. American *Coleoptera*; Dohrn, S. E. Z. xlvii, pp. 182-187.—Taylor, *Geodephaga*, Vancouver Island; Canad. Ent. xviii, pp. 34-37.—Townsend, *Staphylinidae*, Canad. Ent. xviii, pp. 24-26.—Olivier, *Photuris* (496).—Schwarz, *Scolytidae* (645).—Leng, *Cerambycidae* (397).—*Leptura varicornis*; Dohrn, S. E. Z. xlvii, pp. 124, 372 (cf. Schwarz, Ent. Am. ii, p. 161).

Hymenoptera. Provancher (562).—Notes on *Hymenoptera* collected near Ottawa; Guignard, Canad. Ent. xviii, pp. 68-72.—Blake, *Mutillidae* (56).—Forel, *Formicidae* (203, 206).—Mayr, *Formicidae* (429, 431, 432).—Ashmead, *Cynipidae* (8); *Chalcididae* (10, 11).—Howard, *Chalcididae* (310); *Proctotrupidae* (309).

Lepidoptera. Grote, distribution (261); Maynard (428), Hulst (318), Kellicott (343, 344), Snellen (672), Wailly (718).—Edwards, *Rhopalocera* (162, 163).—Elwes, *Parnassius* (165).—French *Rhopalocera* (215).—Plötz, *Hesperiidae* (556).—Saunders, Canadian *Rhopalocera* (631).—Edwards, *Heterocera* (160, 161)—Grote, *Sphingidae* (260).—Holland *Sphingidae* (297).—Fernald, *Sphingidae* (192).—Smith, *Saturniidae* (665).—Bowles, Canadian *Catocala*; Rep. E. Soc. Ont. xvi, pp. 55-60.—Bates, *Geometridae* (33, 34).—Hulst, *Geometridae* (314, 315, 317, 319), *Pyralidae* (313).—Geddes, Newfoundland, Lake Superior, and Hudson's Bay; Canad. Ent. xviii, pp. 204 & 205. —Moffat, additions to the Canadian list of; Canad. Ent. xviii, p. 31.—List of *Lep.* collected in North-west Territories, by Dr. Robert Bell, in 1882; Rep. Geol. and Nat. Hist. Survey, Canada, 1882-84, pp. 36 & 37cc, and 60DD. —Grote, Staten Island, Canad. Ent. xviii, pp. 95 & 96.—Behr, California (41, 42).

Rhynchota. Ashmead (12), Provancher (563), Uhler (708, 709).—Bergroth, *Aradidae* (49, 50).—Oestlund, *Aphididae* of Minnesota (494).—Townsend, List of *Hemiptera-Heteroptera* collected in South Louisiana; Canad. Ent. xviii, pp. 116-118.—Duzee, *Blissus* at Buffalo; Canad. Ent. xviii, p. 209.

Diptera. Bigot, *Tanypezidi* (53), Coquillett (126, 127, 128), Williston (741, 742, 743), Osten-Sacken, *Eristalis* (508).—California (see also Systematic, *Bombyliidae*, *Rhabdopselaphus*).

Neuroptera. Aaron, *Psocidae* (1).—MacLachlan, *Odonata* (416).—Hagen, *Phryganeidae*, larvæ at 11,500 ft. elevation; Canad. Ent. xviii, p. 178.

Orthoptera. Bruner (85).—Caulfield, Montreal, Canad. Ent. xviii, p. 211.

10. CENTRAL AMERICA, INCLUDING MEXICO.

Insecta. Godman & Salvin (247).

Coleoptera. Poll (539, 540); Quedenfeldt (570).—P. Am. Ent. Soc. xiii, pp. vii–xl.—Regimbart, *Gyrinidæ* (582).—Candèze, *Elateridæ* (112).—Dugès, *Cantharidæ*, Bull. Soc. Z. Fr. xi, pp. 578–582.—Faust, *Curculionidæ* (184).—Pascoe, *Curculionidæ* (524).—Baly, *Diabrotica* (27).—See also Systematic, *Chrysomelidæ*, *Colaspis jacobyi*.—Dugès, *Metamorphoses* (156).

Hymenoptera. Kohl, *Pompilidæ* (358).—André, *Formicidæ* (7).—Forel, *Formicides* (203).—Mayr, *Formicidæ* (431, 432).—Mayr, *Cynipidæ* (430).—Schletterer, *Evania* (634, 635).

Lepidoptera. Staudinger, *Rhopalocera* (682).—Plötz, *Hesperiidæ* (556).

Diptera. Bigot, *Tanypezidi* (53).

Rhynchota. Löw, *Psyllidæ* (410).—Ashmead, Mexico (12).—See Systematic, *Coccidæ*, *Lecanopsis*.

Neuroptera. Packard, *Thysanura* (517).—Sely, *Agrionines* (652).

11. ANTILLES.

Coleoptera. Olivier, *Photuris* (496).—Baer, *Hydrophilus* (21, p. 106).—Jamaica, see Systematic, *Lampyrides*, *Photuris jamaicensis*.—Quedenfeldt, Porto Rico (570).—Baly, Porto Rico, *Diabrotica* (27).

Hymenoptera. Kohl, *Pompilidæ* (358).

Lepidoptera. Staudinger, Cuba, *Rhopalocera* (682).—Müschler, Jamaica (470).

Diptera. Bigot, *Tanypezidi*, Cuba (53).—Williston, San Domingo (741).—Bergroth, *Aradidæ* (49).—Scott (646).

12. SOUTH AMERICA.

Insecta. Dent, Brazil (138).—Godman & Salvin (247) (in many places).—Göldi (248).

Coleoptera. Waterhouse (726).—Fleutiaux, *Cicindelidæ* (199).—Regimbart, *Gyrinidæ* (582).—Fauvel, *Pæderus chilensis* (190).—Schaufuss, *Pselaphidæ* (632).—Poll, *Ægognathus* (535).—Sallé, *Ancistrosoma* (629).—Poll, *Cetonidæ* (539).—Candèze, *Elateridæ* (112).—Bourgeois, *Lycides* (74).—Olivier, *Lampyrides* (496, 497).—Haase, *Phengodes* (270).—Kirsch, *Heteromera* (354).—Faust, *Curculionidæ* (184).—Pascoe, *Curculionidæ* (521, 524).—Jacoby, *Chrysomelidæ*, *Amazons* (324).—Baly, *Diabrotica* (24, 27).—Fowler, *Languriidæ* (212).—Gorham, Amazonian, *Eudomychidæ* (251).—Poll, Curaçoa, *Cicindelidæ* (532).—Cayenne, see also Systematic, *Eumolpides*, *Rhabdopterus decipiens*.—Borre, Brazil, *Scarabeidæ* (67, 71, 72).—Müller, W., Brazil, *Oncideres* (478).—Brazil, see also Systematic *Eumolpides*, *Metaxyonycha signata* and *Colaspis fastidiosa*.—Berg, Argentine, *Cerambycidæ* (47).—Uruguay, see also Systematic, *Telephorides*, *Phengodes uruguayensis*.—Colombia, see also Systematic, *Eumolpides*, *Alethexias striatulus*.—Ecuador, see also Systematic, *Lucanidæ*, *Chiasognathus gaujoni*.—Peru, see also Systematic, *Eumolpides*, *Colaspis lutescens*.

and *Colaspoides igneicollis*.—Peru and Chili, see also Systematic, *Scarabæidae*, *Phyllognathus*.—Reitter, Chili (589).—Morawitz, Chili, *Ceroglossus* (466).—Chili, see also Systematic, *Cerosterna oblita* and *Gyriosomus*.

Hymenoptera. Kohl, *Pompilidae* (358).—Forel, *Formicidae* (203, 206, 207).—Mayr, *Eciton Labidus* (432).—Kirby, *Chalcididae*, *Tenthredinidae* (352).—Schletterer, *Eivania* (634).—Brent, Trinidad ants (79).—Müller, Brazil (472, 473, 474).—Holmberg, Argentine Rep., Bahia, Blanca (293, 299).

Lepidoptera. Weyenbergh (733).—Staudinger, *Rhopalocera* (682).—Plötz, *Hesperiidae* (556).—Kirby, *Sphingidae* (350).—Müller, *Nymphalidae* larvæ (475).—Uruguay, see also Systematic, *Palustra uruguayensis*.—Calvert, Chili, Catalogue (104).

Diptera. Weyenbergh (734).—Bigot, *Tanypezi* (53).—Williston, Catalogue of *Syrphidae* (742).—Röder, *Notacanthus* (616).—Röder, Colombia, Ecuador, Peru (615).

Rhynchota. Bergroth, *Aradidae* (49).—Göldi (249).—Scott (646).

Neuroptera. Selys, *Agrionines* (652).

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Brauer (75), Omboni (506).—Miall & Denny, Fossil cockroaches (444); Scudder (647).—Scudder, *Mormolucoides articulatus* larva (648).—Resumé of Brongniart's "Les Insectes fossiles des terrains primaires"; Goss, P. E. Soc. 1886, pp. iii–viii.—Insect tracks simulating vegetable impressions; J. R. Micr. Soc. (2) vi, p. 238.—The operations of a prehistoric beetle; Scudder, Canad. Ent. xviii, pp. 194–196.—Fossil insects from the Coal measures of Raven Head exhibited; P. Liverp. Soc. xl, p. liv.—Resumé of Gosse's paper [*cf.* Zool. Rec. xxii (128)] on carboniferous and Silurian fossil insects given by Bargagli, Bull. Soc. Ent. Ital. xviii, pp. 143–152.—Brongniart's paper on early fossil insects summarized; Kosmos, xviii, pp. 64–67.—Insects in amber, Helm (282).—Scudder (649) describes as new mesozoic cockroaches, *Ctenoblattina*, n. g., p. 442, for *C. arcta*, n. sp., English Purbecks, p. 443, pl. xlvi, figs. 1 & 2; *Rithma gossii*, p. 445, pl. xlvi, fig. 15, *disjuncta*, p. 446, pl. xlvi, fig. 14, *daltoni*, p. 449, pl. xlvi, fig. 16, *R. (?) minima*, p. 450, pl. xlviii, figs. 2, 2a, 8g, & 11, English Purbecks; *Mesoblattina blakei*, p. 452, pl. xlvi, fig. 12, *bensoni*, p. 453, pl. xlvi, fig. 17, Upper Lias of Gloucestershire, *swintoni*, p. 454, pl. xlvi, fig. 10, English Purbecks, *geikiei*, p. 454, pl. xlvi, fig. 9, Warwickshire Lias, *higginsii*, p. 455, pl. xlvii, fig. 14, *bucklandi*, p. 457, pl. xlvii, fig. 2, *murrayi*, p. 458, pl. xlvii, fig. 4, *brodiei*, p. 459, pl. xlvii, fig. 7, *mantelli*, p. 460, pl. xlvii, fig. 9, *hopei*, p. 461, pl. xlvii, fig. 11, *peachii*, p. 461, pl. xlvii, fig. 10, from the English Purbecks; *Elisama bucktoni*, p. 466, pl. xlvii, figs. 8 & 12, English Purbecks, *kirkbyi*, p. 467, pl. xlvii, fig. 3, English mesozoic beds; *Pterinoblattina curtisii*, p. 471, pl. xlviii, fig. 16, Upper Lias of Gloucestershire; *Nannoblattina*, n. g., p. 475, for *N. prestwichii*, p. 475, pl. xlviii, fig. 3, *woodwardi*, p. 476, pl. xlviii, fig. 6, English Purbecks, and to include *Blattina similis*, Gieb.; *Dipluroblattina*, n. g., for *D. bailyi*, pl. xlviii, fig. 5, p. 476, English Purbecks; *Diechoblattina*, n. g., p. 477, for *D. wallacei*, English Purbecks,

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IV.—ECONOMIC.

Reports, Fletcher, Canada (198).—*Forbes, 14th report on the noxious and beneficial insects of Illinois.—*Nickerle, O., Bericht über die im Jahre, 1885, der Landwirthschaft Böhmens schädlichen Insecten (cf. Bull. Soc. Ent. Fr. (6) vi, p. cxxiii).—Oestlund, Minnesota (494); Ormerod (509, 510), Riley (606, 607, 608), Trimen (705), Whitehead (735).—Insects injurious in 1886; B. E. Z. xxx, p. xxiii.—Apparition en grande quantité de q. q. insectes dans les environs de Lille pendant l'été de 1885; Bull. Sci. Nord. (2) ix, p. 48.—Injurious insects in Bohemia; Nickerle (485).—Insects injurious in Hungary in 1885; Rov. Lapok, pp. 223–225.—Insects injurious in Russia in 1886; * "St. Petersburger Zeitung, No. 37" (cf. Ent. Nachr. xii, p. 349).—Insects injurious to agriculture in N. America, notes on; Forbes, Ent. Am. ii, pp. 173–175.—Insects injurious in Michigan; Cook, Ent. Am. i, p. 209.—Notes of 1885 on some injurious and other common insects; Jack, Canad. Ent. xviii, pp. 21–23.—Insects destructive to fish; Dimmock (141).—Insects injurious to sugar-cane; Roth (619).—Locust plagues; Nevins (481).—Diseased head in horse attributed to *Blaps*; Bull. Soc. Ent. Fr. (6) v, p. cexv.—*Diadoxus erythrurus* destructive to pine in Australia; P. Linn. Soc. N.S.W. x, p. 721.—*Corymbites æneus* injurious in cornfields; Ent. Nachr. xii, p. 348.—*Mylabris oleæ* as a drug; Bonnet (64).—*Curculionidæ* injurious to *Cycadææ*; Westwood (732).—Ravages of *Otiorrhynchus populeti* on vines; Wény, Rov. Lapok, iii, pp. 3–9 & ii.—Destruction of beetroot in Russia by *Cleonus betavorus*; Bull. Soc. Ent. Fr. (6) vi, pp. clxxii–clxxiv.—Ravages of *Hylesinus aculeatus* and *Phloeosinus dentatus*; Ent. Am. ii, pp. 76–78.—*Bruchus* and beans; Wood (748).—Vines, *Vesperus xatanti*, Xamheu, Bull. Ins. Agr. xi, pp. 167–173.—*Lina tremulæ* ravages; Bull. Soc. Ent. Fr. (6) vi, p. clxxxi.—*Phyllotreta melæna* destructive to cabbage, &c.; Wood, Ent. M. M. xxiii, p. 92.—*Haltica* of the vine; Bull. Ins. Agr. xi, p. 79.—Ravages of an ant ("La fourmi sauva"), and mode of destruction in Brazil; Rev. Sci. pp. 371 & 372.—*Syntomaspis druparum*, Boh., destructive to seeds of apple; Horvath, Rov. Lapok, iii, pp. 125 & xviii.—*Nematus erichsoni* in Canada: ravages and remedies; Nat. Canad. xv, pp. 45–53.—*Tortrix pomana* ravages; Tr. Hertf. Soc. iv, pp. 50–52.—*Tortrix ambiguella*; Koch (357).—*Coleophora nigricella* injurious to cherries; Ent. Nachr. xii, p. 220.—*Carum carui* damaged by *Depressaria nervosa*, Hw.; B. E. Z. xxx, p. xix.—*Ceroplastes ruscii* destroyed by larvæ of *Erastria scitula*; Bull. Soc. Ent. Fr. (6) vi, p. cxxxiv.—*Cecidomyia* injurious to vine; Aloï (5).—Larva of *Cephe-*

nomylia stimulator in lung of roe-deer; Wien. ent. Z. v, p. 305.—*Æstrus purpureus* larva in nasal cavities of horses; Brauer (76).—Species of *Eurydema* injurious to potatoes; Ent. Nachr. xii, pp. 301 & 350.—Tea-bugs (*Helopeltis*); Waterhouse (724).—*Notonecta undulata*, Say, destroying gold-fish; J. Trenton Soc. i, p. 11.—*Chionaspis euonymi* ravages; P. E. Soc. 1886, p. ii.

Phylloxera. *Jornal de Horticulura practica xvii. Oporto: January, 1886; cf. P. Liverp. Soc. xl, p. liv.—*Rapport sur le service du *Phylloxera*, by the Director of Agriculture in France; cf. Le Nat. viii, p. 271.—Progress of *Phylloxera* in Hungary; Horvath, Rov. Lapok, iii, pp. 188 & 189.—*Phylloxera* at the Cape; Nature, xxxiii, p. 392.—*Phylloxera*, remedies; C.R. cii. p. 347.

Aphis rumicis destructive to mangold-wurzel; Ann. N. H. (5) xviii, p. 1.—*Lachnus quercus* (*Aphididæ*) injurious to chestnuts; Bull. Soc. Ent. Fr. (6) vi, p. clxxxi.—Ravages of *Lepisma saccharum* and of *Termites* in libraries and amongst papers, &c., noticed, and means of prevention; Hagen, S. E. Z. xlvii, pp. 270-277.—*Lepisma domestica*, Packard, injurious in libraries; Hagen, Canad. Ent. xviii, pp. 221-230.—Ravages of *Heliothrips adonidum*; Cameron (109).—*Forficula auricularia* in gardens; Lendl., Rov. Lapok, iii, pp. 16-18.—Insects as distributors of a fungus injurious to trees; Ent. Nachr. xii, p. 305.—*Hypoderma bovis* infesting man; Schoyen (643).—Dipterous larvæ living in the human stomach, and *Diptera* found about exhumed bodies; C.R. Ent. Belg. 1886, pp. cxxx-cxxxii.

Sphex paludosa and *Stauronotus maroccanus*; An. Soc. Esp. xv, pp. 74 & 75.

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Beekeeping; Canus (113), Ciesielski (124), Douglas (149), Gärtner (235), Huber (311), Jenyns (332), Kubli (381), Planta (553).—Artificial fertilization of Queen-bee; Riley (606).—Enemies of Bees; Hess (285).

Silk culture in N. America; Riley, Rep. 1885, pp. 214-228, & (609).—Decadence of silk culture in Hungary; Biro, Rov. Lapok, iii, pp. 31-35 & v.—*Note on silk-producing *Lepidoptera* of the district of Hazaribag; Dumaine, Le petit Bengali, 24 Mai, 1886; cf. Bull. Soc. Ent. Fr. (6) vi, p. cviii.—Silk-moths: Camboué (105); Wailly (718); Bigot, Bull. Soc. Acclim. (4) iii, pp. 331-336; Fallou, t. c. pp. 198-203.—"Uji" silkworm

disease in Japan; Sasaki (630).—Nomenclature détaillée des produits, appareils et objets divers qui ont figuré à l'exposition séricicole; par M. J. Dusuzeau, Ann. Soc. Agric. Lyon, viii, pp. 243-260.—Exposition de sériciculture; compte rendu par M. A. Leger, Ann. Soc. Agric. Lyon, viii, pp. 221-236.—Rearing of *Bombyx pernyi*; Royet, t. c. pp. 237-242.—Silk of *Thecphila mandarina* noticed; Le Nat. viii, p. 255.—*Antheraea pernyi*, rearing of; Bull. Soc. Ent. Fr. (6) vi, p. clxxxiv.—Fishing-lines from silk glands; Fielde (194).—L'industrie de la Cochenille au Guatémala; Bull. Soc. Acclim. (4) iii, p. 122.

On Chinese Insect white wax; Hosie, Rep. Brit. Ass. 1885, p. 1064.

Vesicating substance obtained from *Cnethocampa processionea*; Goossens (250).

Successful acclimatization of *Bombi* in New Zealand.

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Apristus subtransparens, Motsch., noticed; Bates, Ann. N. H. (5) xvii, p. 206.

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Coscinia funerula, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 440, n. sp.

Graphipterus circumdatus, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v, p. 312, pl. vi, fig. 6, n. sp.

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Scarites designans, Walk., noticed and referred to *Oxylobus*; Bates, Ann. N. H. (5) xvii, p. 210.

Distichus, Motsch., to be used in place of *Teniolobus*, Chaud.; Goz., Recherche, p. 7.

Clivina indica, Putz., = (*rugosifrons*, Niet.); Bates, Ann. N. H. (5) xvii, p. 72.

Tefflus, table of; Kolbe, Ent. Nachr. xii, p. 225.

Tefflus megerlei, *hacquardi*, *carinatus*, *violaceus*, *cribriceps*, noticed; Bates, Ent. M. M. xxii, p. 194.

Tefflus zanzibaricus, Zanzibar, p. 227, *reichardi*, Centr. Africa, p. 228, Kolbe, Ent. Nachr. xii; *T. cychroides*, Mamboia, Bates, Ent. M. M. xxii, p. 195: n. spp.

Craspedophorus deflexus, Cameroons, *abnormis*, Mpwapwa, Bates, Ent. M. M. xxiii, p. 9; *C. glaber*, *cameronus*, Cameroons, Bates, Ent. M. M. xxii, p. 196; *C. pustulosus*, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v, p. 314: n. spp.

Eudema (Panagæus) chaudi (= *E. lætum* var. ? Chaud.), *galla*, pl. vi, fig. 7, p. 312, *cordicolle*, pl. vi, fig. 8, p. 313, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v: n. spp.

Panagæus retractus, Walk. [*cf. Mochtherus (Coptoderinæ)*].

Epigraphus insolitus, Cameroons, Ent. M. M. xxiii, p. 10, n. sp.

Chlenius cæruleicollis, Chaud., = (*insperatus*, Horn); Horn, P. Am. Ent. Soc. xiii, p. xii. *C. pulchellus*, Boh., variation described; Raff., Ann. Soc. Ent. Fr. (6) v, p. 316. *C. rugulosus*, Niet., *frater*, *velocipes*, *melanopterus*, Chaud., noticed; Bates, Ann. N. H. (5) xvii, pp. 74 & 75. *C. circumdatus*, Br., = (*cupricollis*, Niet.), *C. cinctus*, Fabr., = (*pulcher*, Niet.); *id. t. c.* p. 74.

Chlenius mamboianus, Mamboia, p. 10, *euryscopus*, Gaboon, *lastii*, p. 11, *swahilius*, Mpwapwa, *makololo*, Zambesi, *sculptilis*, Mamboia, p. 12, Bates,

Ent. M. M. xxiii; *C. deserticola*, *instabilis*, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v, p. 315; *C. cyaneo-nitens*, *convexus*, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 310; *C. nigripes*, N. Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 140: n. spp.

Hololeius nitidulus, Dej., = (*Chlœnius ceylonicus*, Niet.); Bates, Ann. N. H. (5) xvii, p. 75.

Sphæroodes impunctatus, Mombas, Bates, Ent. M. M. xxiii, p. 54, n. sp.

Pseudocupis, Voet., = (*Broscus*, Panz. auct.); Goz., Recherche, p. 6.

Diglymma, n. gen., near *Metaglymma*, p. 360, for *D. ovipenne*, pl. xii, fig. 3, and *dubium*, p. 361, n. spp., New Zealand; Sharp, Tr. R. Dublin Soc. (2) iii.

Metaglymma rufipes, N. Zealand, Broun, Man. N. Z. Col. p. 876; *sulcatum*, N. Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 361, pl. xii, fig. 4: n. spp.

Acallistus, n. gen., near *Promecoderus*, p. 362, for *A. simplex*, n. sp., New Zealand; Sharp, Tr. R. Dublin Soc. (2) iii.

Mecodema litoreum, N. Zealand, Broun, Man. N. Z. Col. p. 875; *ducale*, p. 358, pl. xii, fig. 1, *rugiceps*, p. 359, pl. xii, fig. 2, *metallicum*, p. 359, N. Zealand, Sharp, Tr. R. Dublin Soc. (2) iii: n. spp.

Oopterus fulvipes, *sobrinus*, N. Zealand, n. spp. (placed by error in *Cnemacanthidæ*), p. 396; Broun, Man. N. Z. Col.

Lecanomerus stenopus, N. Zealand, Broun, Man. N. Z. Col. p. 880, n. sp.

Disphæricus ovicollis, Ceylon, Bates, Ann. N. H. (5) xvii, p. 73; *D. multiporus*, Rio Ogowé, *tarsalis*, Angola, p. 193, *lastii*, Mamboia, p. 194, Bates, Ent. M. M. xxii: n. spp.

Maraga planigera, Walk., noticed and referred to *Orthogonius*; Bates, Ann. N. H. (5) xvii, p. 211.

Anisodactylus (*Harpalus*) *dispellens*, Walk., noticed; Bates, Ann. N. H. (5) xvii, p. 75.

Bradycellus obsoletus, Say, and *Tachycellus nitidus*, Dej., are the same; Horn, P. Am. Ent. Soc. xiii, p. xii.

Harpalus, tarsal suckers of; Pero, Boll. Mus. Tor. i, No. 13.

Ophonus calceatus, Sturm., *diffinis*, *puncticollis*, *rufibarbis*, and *parallelus*, noticed; Fowler, Ent. M. M. xxii, p. 174.

Platymetopus (*Selenophorus*) *colombensis*, Niet., noticed; Bates, Ann. N. H. (5) xvii, p. 76.

Siopelus ferreus, Ceylon, Bates, Ann. N. H. (5) xvii, p. 76, n. sp.

Barysomus gyllenhalii, Dej., = (*Oosoma arenaria*, Niet.); Bates, Ann. N. H. (5) xvii, p. 77.

Bradybanus festivus, Dej., = (*ornatus*, Redt., and *Calodromus exornatus*, Niet.); Bates, Ann. N. H. (5) xvii, p. 77.

Calathomimus, n. gen., p. 77, for *C. maculatus*, p. 77, *consors*, p. 78, Ceylon, n. spp.; Bates, Ann. N. H. (5) xvii.

Selenophorus temperatus, Korea, Kolbe, Arch. f. Nat. lii (1) p. 176, pl. xi, fig. 22, n. sp.

Acupalpus derogatus, Walk., noticed; Bates, Ann. N. H. (5) xvii, p. 80.

Acupalpus reitteri, Sicily, Rag., Nat. Sicil. v, p. 158, n. sp.

Stenolophus smaragdulus, Fabr., = (*Harpalus stolidus*, Walk.) ; Bates, Ann. N. H. (5) xvii, p. 211. *S. 5-pustulatus*, Wied., note on, p. 79 ; Bates, Ann. N. H. (5) xvii.

Stenolophus polygenus, p. 79, *opaculus*, p. 80, Ceylon, Bates, Ann. N. H. (5) xvii ; *S. ciffrei*, Beziers, Barb., Feuille. Nat. xvi, p. 21 : n. spp.

Anoplogenus microgonus, p. 78, *renitens*, p. 79, Ceylon, Bates, Ann. N. H. (5) xvii ; *A. impubis*, Korea, Kolbe, Arch. f. Nat. lii (1) p. 177 : n. spp.

Lepithrix foliolosus, Niet., referred to *Anoplogenus* ; Bates, Ann. N. H. (5) xvii, p. 79.

Tachycellus lamprus, Ceylon, Bates, Ann. N. H. (5) xvii, p. 80, n. sp.

Drimostoma marginale, Walk., noticed ; Bates, Ann. N. H. (5) xvii, p. 212.

Polpochila, position discussed ; Horn, P. Am. Ent. Soc. xiii, p. ix.

Pterostichini, the New Zealand genera and subgenera of, tabulated and discussed ; Sharp, Tr. R. Dublin Soc. (2) iii, p. 365.

Feronia, tarsal suckers of ; Pero, Boll. Mos. Tor. i, No. 13. *F. (Omaseus) vulgaris*, L., tarsal hairs and glands ; Dahl, Arch. mikr. Anat. xxv, pp. 240, 249, & 250, pl. xii, figs. 6 & 7.

Pterostichus ovatellus, Chaud., ♂ described ; Sharp, Tr. R. Dublin Soc. (2) iii, p. 370.

Pterostichus simillimus, *P. (Euryperis) curtatus*, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 312 ; *P. (Trichosternus) compressus*, New Zealand, p. 366, pl. xii, fig. 6, *P. brounians*, p. 367, *myrmidon*, p. 368, pl. xii, fig. 8, *constrictellus*, p. 368, *longiformis*, *oscillator*, p. 369, *nigrifrons*, p. 451, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii : n. spp.

Zeopæcilus, n. subg. (of *Pterostichus*), p. 366, including *P. calcaratus*, p. 366, pl. xii, fig. 7, *achilles*, p. 367, New Zealand, n. spp. ; Sharp, Tr. R. Dublin Soc. (2) iii.

Holcaspis impiger, p. 879, *mordax*, p. 938, New Zealand, Broun, Man. N. Z. Col., n. spp.

Trichosternus alternus, *urquharti*, p. 877, *curvipes*, p. 878, *erythropus*, p. 913, *meritus*, *angulatus*, p. 914, *convexus*, *agriotis*, *erraticus*, p. 915, *riparius*, *curtulus*, p. 916, *suspicius*, p. 917, *ampliocollis*, p. 918, *virens*, p. 937, New Zealand, Broun, Man. N. Z. Col., n. spp.

Omaseus, Steph., = (*Lyperus*, Chaud., = *Lyperosomus*, Motsch.) ; Goz., Recherche, p. 8.

Omaseus diversus, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 311, n. sp.

Abax oblongus, Dej., = (*hetzeri*, Müll.) ; Heyd., Wien. ent. Z. v, p. 42.

Haptoderus calathoides, New Zealand, Broun, Man. N. Z. Col. p. 879, n. sp.

Steropus madidus, F., injurious to mangold roots ; Orm., Rep. lx, pp. 51-53.

Platysmus retinens, Walk., noticed and referred to *Eccoptogenius* ; Bates, Ann. N. H. (5) xvii, p. 212.

Tarastethus debilis, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 373, n. sp.

Sympiestus, n. g. near *Cyclothorax* and *Tarastethus*, p. 372, for *S. syntheticus*, n. sp., New Zealand, p. 373, pl. xii, fig. 10; Sharp, Tr. R. Dublin Soc. (2) iii.

Speluncarius, n. subg. of *Tapinopterus*, for *T. speluncicola*, Chaud., and *S. anophthalmus*, Dalmatia, n. sp.; Reitt., Wien. ent. Z. v, p. 171.

Tapinopterus, the species revised; Reitt., Wien. ent. Z. v, pp. 170-174. *T. capitatus*, Chaud., referred to *Pterostichus*; Reitt., Wien. ent. Z. v, p. 170.

Tapinopterus imperialis, Morea, p. 172, *thessalicus*, Thessaly, p. 173, Reitt., Wien. ent. Z. v, n. spp.

Adelopterus, n. g. for *Tapinopterus ambiguus*, Fairm.; Reitt., Wien. ent. Z. v, p. 174.

Haptotapinus, n. g. for *Tapinopterus crassiusculus*, Chaud.; Reitt. Wien. ent. Z. v, p. 174.

Elasmopterus, n. g. for *E. oertzeni*, Greece, n. sp.; Kraatz, Deutsche e. Z. xxx, p. 431.

Pæcilus lævigatus, Mén., position discussed; Tschit., Hor. Ent. Ross. xx, p. 242.

Sogines balassogloi, Turkestan, Tschit., Hor. Ent. Ross. xx, p. 242, n. sp.

Eucamptognathus fulgidicinctus, Madagascar, Poll., Notes Leyd. Mus. viii, p. 229, n. sp.

Abacetus atratus, Dej., = (*Distrigus costatus*, Niet.), and *A. antiquus*, Dej., = (*Dis. submetallicus*, Niet., and *Argutor relinquens*, Walk.); Bates, Ann. N. H. (5) xvii, pp. 143 & 144.

Abacetus wakefieldi, Mombas, p. 55, *cameronus*, Cameroons, *leistoides*, Gaboon, *nyassæ*, Lake Nyassa, p. 56, Bates, Ent. M. M. xxiii; *A. lioderes*, *carinifrons*, Ceylon, Bates, Ann. N. H. (5) xvii, p. 144: n. spp.

Phonias, n. n. for *Argutor*, Chaud. et auct.; Goz., Recherche, p. 8.

Lagarus, Chaud., to be called *Argutor*, Steph.; Goz., Recherche, p. 8.

Lagarus (?) *impunctatus*, Ceylon, Bates, Ann. N. H. (5) xvii, p. 145, n. sp.

Metaxys biguttatus, Chaud., description corrected; Raff., Ann. Soc. Ent. Fr. (6) v, p. 316.

Zabrus chinensis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 313, n. sp.

Zolini, new group established for *Zolus*, n. g., p. 371, including only *Z. helmsi*, New Zealand, n. sp., p. 372, pl. xii, fig. 11; Sharp, Tr. R. Dublin Soc. (2) iii.

Amara coraica, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 173; *A. fairmairei*, p. 316, *abyssinica*, p. 317, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v, p. 317: n. spp.

Curtionotus compositus, Walk., noticed; Bates, Ann. N. H. (5) xvii, p. 211.

Calathus gregarius, Say, crepitation of; Townsend, Canad. Ent. xviii, p. 79; Horn, t. c. p. 119. *C. deformipes*, Broun, referred to *Anchomenus*; Broun, Man. N. Z. Col. p. 937. *C. cycloderus*, n. n. for *orbicollis*, Mor., nec Motsch.; Heyd., Deutsche e. Z. xxx, p. 270.

Calathus aneocupreus, *lateritius*, p. 314, *falsicolor*, p. 315, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Anchomenus illocatus, Ceylon; Bates, Ann. N. H. (5) xvii, p. 146; *A.*

oreobius, p. 876, *adamsi*, p. 937, New Zealand, Broun, Man. N. Z. Col. : n. spp.

Platynus bembidioides, Kirb., = (*Anch. decempunctatus*, Reiche) ; Horn, P. Am. Ent. Soc. xiii, p. xii.

Otenognathus, Fairm., distinguished from *Anchomenus* and *Colpodes* ; Shp., Tr. R. Dublin Soc. (2) iii, pp. 363 & 451. *C. latipennis*, n. n. (= *Anchomenus elevatus*, Bates, nec White) ; *id. t. c.* p. 363.

Otenognathus pictonensis, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 364, pl. xii, fig. 5, n. sp.

Colpodes ænos, p. 146, *lampriodes*, p. 147, *retusus*, *repletus*, p. 148, *iteratus*, p. 149, Ceylon, Bates, Ann. N. H. (5) xvii ; *C. semiceneus*, p. 315, *subsericatus*, *stricticollis*, *sycophanta*, p. 316, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi : n. spp.

Cyclothorax to be placed in *Pterostichini* : Sharp, Tr. R. Dublin Soc. (2) iii, p. 373.

Megalonychus sculptilis, *excisus*, p. 54, *swahilius*, p. 55, E. Trop. Africa, Bates, Ent. M. M. xxiii ; *M. hirtus*, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v, p. 317 : n. spp.

Euplynes dohrni, *cyanipennis*, and *ruficeps*, noticed ; Bates, Ann. N. H. (5) xvii, p. 147.

Patrobus clavipes, Th., specific characters of ; Th., Bull. Soc. Ent. Fr. (6) v, p. ix.

Patrobus yunnanus, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 317, n. sp.

Anophthalmus, Gestros, descriptions and plate [*cf.* Zool. Rec. xxii, *Ins.* (121)] of Italian species of, are reproduced in Bull. Soc. Ent. Ital. xviii, pp. 33-41, pl. i : the Pyrenean species discussed ; Perrin, Rev. d'Ent. v pp. 138-140.

Trechus sublaevis, *bipartitus*, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v, p. 318, n. spp.

Lachnophorus elegantulus, Mann., = (*sculptifrons*, Bates) ; Horn, P. Am. Ent. Soc. xiii, p. xii.

Asaphidion, n. n. for *Tachypus*, Cast. auct., nec Weber ; Goz., Recherche, p. 6.

Bembidium scintillans, Bates, = (*vinnulum*, Casey) ; Horn, P. Am. Ent. Soc. xiii, p. xli. *B. femoratum* var. = (*anglicanum*, Shp.) ; Fauv., Rev. d'Ent. v, p. 271. *B. stabile* and *lugubre*, Lec., are one species ; Horn, P. Am. Ent. Soc. xiii, p. xiii ; also *B. grapii*, Gyll., = (*nitens*, Lec.) : *id. loc. cit.* *B. finitimum*, Walk., noticed and referred to *Tachys* ; Bates, Ann. N. H. (5) xvii, p. 211.

Bembidium (Peryphus) fontinale, *B. (Notaphus) aethiopicum*, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v, p. 319 ; *B. europis*, Ceylon, Bates, Ann. N. H. (5) xvii, p. 156 ; *B. tekapoense*, p. 880, *attenuatum*, p. 881, New Zealand, Broun, Man. N. Z. Col. : n. spp.

Cillenum chalmeri, New Zealand, Broun, Man. N. Z. Col. p. 881 ; *batesi*, p. 374, *C. (?) subcæcum*, p. 375, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii : n. spp.

Anillus pallidus, New Zealand, Broun, Man. N. Z. Col. p. 918, n. sp.

Tachyta umbrosa, Motsch., noticed ; Bates, Ann. N. H. (5) xvii, p. 151.

Tachys globulus, Dej., and *globosus*, Baudi, differentiated; Reitt., Wien. ent. Z. v, p. 332. *T. atomarius*, Woll., p. 152, *ornatus*, *scydmaenoides*, p. 154, *emarginatus*, Niet., p. 155, noticed; Bates, Ann. N. H. (5) xvii.

Tachys subovittatus, p. 151, *spilotus*, p. 152, *T. (Barytachys) eucides*, *perypphinus*, p. 153, *infans*, p. 154, *amplians*, p. 155, *notaphoides*, p. 156, Ceylon, Bates, Ann. N. H. (5) xvii; *T. latipennis*, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 374: n. spp.

HALIPLIDÆ.

[Cf. Regimbart (583).]

Haliplus oceanicus, Sumatra, Reg., Notes Leyd. Mus. viii, p. 139, n. sp.

DYTISCIDÆ.

[Cf. Broun (86), Gozis (252), Kolbe (360), Regimbart (583).]

Hydrovatus atricolor, Reg., var. = (*politus*, Shp.); Reg., Notes Leyd. Mus. viii, p. 140.

Yola, n. g., type *Bidessus bicarinatus*, Latr.; Goz., Recherche, p. 8.

Exocelina, n. g., affinities not stated, ? near *Celina*, p. 938, for *E. advena*, n. sp., New Zealand, p. 939; Broun, Man. N. Z. Col.

Copelatus tenebrosus, Reg., = (*pusillus*, Shp.); Reg., Notes Leyd. Mus. viii, p. 140.

Platambus sharpi, Japan, Kolbe, Arch. f. Nat. lii, 1, p. 178, n. sp.

Gaurodytes, note on character of; Hult, Ent. Tidskr. 1886, pp. 90 & 125.

Dichodytes, n. subg. of *Gaurodytes*, for *G. angusticollis*, Sahl., *guttatus*, *binotatus*, and *nitidus*; Thoms., Bull. Soc. Ent. Fr. (6) vi, p. x.

Gaurodytes lapponicus, *wasastjernæ*, *hæffneri*, specific characters given; Th., Bull. Soc. Ent. Fr. (6) vi, p. ix.

Idiolybius, n. g., type *Ilybius fenestratus*, F.; Goz., Recherche, p. 8.

Dytiscus: tarsal hairs and glands; Dahl, (133) pp. 242, &c., 250, &c., pl. xii, figs. 1-5. *D. punctulatus*, F., teratology; Bull. Soc. Ent. Fr. (6) vi, p. clxxix.

Acilius fasciatus, dimorphic female; Cameron, P. N. H. Soc. Glasg. (n.s.) i, p. 300.

GYRINIDÆ.

[Cf. Macleay (411), Regimbart (582, 583).]

Enhydrus froggattii, New Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 141, n. sp.

Dineutes (sub *Gyrinus*) *americanus*, L., = (*assimilis*, Kirb.); Horn, Tr. Am. Ent. Soc. xiii, p. 138. *D. wehnckeii* noticed; Reg., Notes Leyd. Mus. viii, p. 142. *D. regimbarti*, *olivaceus*, p. 247, *wehnckeii*, p. 248, *fauveli*, p. 249, noticed; Reg., Ann. Soc. Ent. Fr. (6) vi. *D. bidens*, Vollenh., = (*denticulatus*); Reg., t. c. p. 247.

Dineutes cribratus, W. Africa, Reg., Notes Leyd. Mus. viii, p. 141, and Ann. Soc. Ent. Fr. (6) vi, p. 248, n. sp.

Porrorhynchus (sub *Dineutes*) *indicans*, Walk., = (*brevirostris*, Reg.); Reg., Ann. Soc. Ent. Fr. (6) vi, p. 250.

Macrogyrus buqueti = (*Dineutes iridescens*, Kirsch); Reg., Ann. Soc. Ent. Fr. (6) vi, p. 250.

Aulonogyrrus algoensis, Reg., var. = (*zanzibanicus*, Reg.); Reg., Ann. Soc. Ent. Fr. (6) vi, p. 251.

Aulonogyrrus vethi, W. Africa, Reg., Notes Leyd. Mus. viii, p. 142, and Ann. Soc. Ent. Fr. (6) vi, p. 250, n. sp.

Gyrinus analis, *G. gibber*, Lec., is a deformity of this; Horn, P. Am. Ent. Soc. xiii, p. xiii. *G. niloticus* var. = (*egyptiacus*, Reg.); Reg., Ann. Soc. Ent. Fr. (6) vi, p. 251. *G. caspius*, *suffriani*, and *natator*, discussed at length, pp. 251-254; *G. curtus*, *japonicus*, and *dimorphus* redescribed, pp. 254 & 255; Reg., t. c.

Gyretes discus, Er., p. 258, *tumidus*, Reg., p. 259, noticed; Reg., Ann. Soc. Ent. Fr. (6) vi.

Gyretes bifenestratus, Venezuela, p. 258, pl. iv, fig. 7, *henoni*, Algeria, p. 259; Reg., Ann. Soc. Ent. Fr. (6) vi: n. spp.

Orectochilus metallicus, *sculpturatus*, *agilis*, *punctipennis*, *regimbarti*, pl. iv, figs. 13 & 13a, *andamanicus*, fig. 14, additional information as to; Reg., Ann. Soc. Ent. Fr. (6) vi, pp. 262-265.

Orectochilus desgodinsi, Darjeeling, p. 260, pl. iv, fig. 10, *punctulatus*, Madras, p. 261, *oblongiusculus*, India, pl. iv, fig. 11, *baeri*, Philippines, pl. iv, fig. 12, p. 262, Reg., Ann. Soc. Ent. Fr. (6) vi: n. spp.

Orectogyrrus schistaceus, Gerst., nec Reg., and *O. cuprifer* var. *elongatus*, p. 268, *polli*, p. 269, described at length; Reg., Ann. Soc. Ent. Fr. (6) vi. *O. oscaris*, Ap., = (*angustior*, Kolbe); *id. t. c.* p. 269. *O. cuprifer* n. var. *elongatus*, W. Africa; *id.* Notes Leyd. Mus. viii, p. 143.

Orectogyrrus stampflii, W. Africa, Reg., Notes Leyd. Mus. viii, pp. 143, and Ann. Soc. Ent. Fr. (6) vi, p. 266, pl. iv, fig. 16; *O. subseriatus*, Zanzibar, p. 265, pl. iv, fig. 15, *leroyi*, Zanzibar, p. 266, pl. iv, fig. 17, *distinctus*, = (*schistaceus*, Reg., olim nec Gerst.), Africa Trop., p. 267, Reg., Ann. Soc. Ent. Fr. (6) vi: n. spp.

HYDROPHILIDÆ.

[Cf. Broun (86), Casey (118), Fairmaire (175), Kuwert (384), Reitter (592, 593), Rey (602).]

Salivary glands in *Hydrophilidæ*; Gazagnaire (239).

Hydrophilus piceus, position of embryo; Hallez (274): alimentary canal of; Vángel (712). *H. ovatus*, sexual distinctions of; Schwarz, Ent. Am. ii, p. 137.

Rygmodes oblongus, Broun, referred to *Saphydus*, Shp.; Broun, Man. N. Z. Col. p. 940.

Exydrus, n. g. near *Hydrostygnum*, for *Oyclonotum flavicorne* and *gibbosum*, Broun; Broun, Man. N. Z. Col. p. 940.

Adolopus vicinus, *rugipennis*, New Zealand, Broun, Man. N. Z. Col. p. 939, n. spp.

Hemisphæra (sub *Hydrobius*) *seriato-punctata*, Perris, = (*infima*, Pand.); Rey, Ann. Soc. L: Lyon, xxxi, p. 281.

Limnocharis, characters of, discussed ; Casey, Bull. Cal. Ac. Sci. ii, p. 167.

Limnocharis polita, *angustula*, p. 168, *alutacea*, p. 169, *congener*, p. 170, *coniciventrif*, p. 171, N. America, Casey, Bull. Cal. Ac. Sci. ii, n. spp.

Berosus obscuriceps, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 31 ; *B. mergus*, New Zealand, Broun, Man. N. Z. Col. p. 883 : n. spp.

Calobius, the species tabulated, pp. 198 & 199 ; Reitt., Wien. ent. Z. v. *C. steinhuhleri*, Dalmatia ; *id. t. c.* p. 199, n. sp.

Octhebius and *Calobius* discussed ; Goz., Recherche, p. 9.

Octhebius pleuralis, Syria, *adriaticus*, Pola, Reitt., Wien. ent. Z. v, p. 157 ; *O. auriculatus*, p. 45, *exaratus*, p. 47, *fuscipalpis*, p. 62, France, Rey, Ann. Soc. L. Lyon (n.s.) xxxii : n. spp.

Helophorus, the palaearctic species tabulated ; Kuwert, Wien. ent. Z. v, pp. 221, 247, & 281. *H. linellus*, n. n. for *linearis*, Kuw. ; *id. t. c.* p. 225.

Helophorus mesopotamiae, Euphrates, *sahlbergi*, Siberia, p. 90, *fallax*, N. Europe, p. 135, *incertus*, Lapland, p. 136, *siculus*, Sicily, p. 137, *balticus*, Borussia, p. 138, *confrater*, Hungary, p. 169, Kuwert, Wien. ent. Z. v ; *H. puncticollis* (Baudi), Corsica, p. 382, Rey, Ann. Soc. L. Lyon, xxxi : n. spp.

Hydræna nilotica, Egypt, p. 78, *armipes* (Kies.), Greece, p. 80, *carinulata*, Madeira, p. 81, *plumipes*, Italy, p. 99, *monticola*, France, p. 100, *sharpi*, Spain, p. 108, Rey, Ann. Soc. L. Lyon (n.s.) xxxii, n. spp.

Cercyodes, n. g., near *Cercyon*, p. 940, for *C. levigatus*, n. sp., New Zealand, p. 941 ; Broun, Man. N. Z. Col.

PLATYPSYLLIDÆ.

[Cf. Kolbe (359).]

STAPHYLINIDÆ.

[Cf. Broun (86), Casey (117, 118), Eppelsheim (171, 573), Fauvel (187, 188, 190, 21), Kolbe (359), Meinert (433), Macleay (411), Olliff (500), Rey (603, 604), Sharp (247, 655)]

The number of abdominal segments discussed ; Casey, Bull. Cal. Ac. Sci. ii, pp. 158-160.

Kraatz protests that numerous species have been unduly merged in others in the latest European catalogues ; Deutsche e. Z. xxx, p. 214.

Aleocharides.

Difficulty of using the tarsal system for classification of ; Casey, Bull. Cal. Ac. Sci. ii, p. 206.

Aphytopus, n. g. without near ally, p. 375, for *A. gracilis*, n. sp., p. 376, New Zealand ; Sharp, Tr. R. Dublin Soc. (2) iii.

Autalia elegans, California, Casey, Bull. Cal. Ac. Sci. ii, p. 204, n. sp.

Falagria fauveli, Sols., = (*M. cingulatus*, MacL.), *M. bicingulatus*, MacL., being distinct ; Oll., P. Linn. Soc. N.S.W. (2) i, pp. 410 & 411.

Falagria pallipes, Tasmania, Oll., P. Linn. Soc. N.S.W. (2) i, p. 411, n. sp. *Colusa*, Casey, and *Echidnoglossa*, Woll., differentiated ; Casey, Bull. Cal. Ac. Sci. ii, p. 259.

- Silusa minor*, Amur land, Epplesh., Deutsche e. Z. xxx, p. 33, n. sp.
Leptusa rufescens, Talysch, Epplesh., Radde Faun. Casp. p. 180, n. sp.
Aleochara, Gr., = (*Astilbus*, auct.); Goz., Recherche, p. 11. *Polystoma*, St., = (*Aleochara*, auct.); *id. t. c.* p. 12.
Copiata, n. n. for subg. of *Polystoma*; Goz., Recherche, p. 12.
Aleochara spissicornis, Er., = (*filum*, Kr.); Kr., Deutsche e. Z. xxx, p. 214.
Aleochara actae, p. 458, *insuavis*, p. 460, Australia, *baliola*, Tasmania, p. 462, *vicina*, Australia, p. 464, Oll., P. Linn. Soc. N.S.W. (2) i; *A. diversicornis*, Lenkoran, Eppesh., Radde Faun. Casp. p. 181; *A. rudella*, Tangier, p. 90, *lamellata*, Algeria, p. 91, *sareptana*, Egypt and Russia, p. 92, *cephalica*, p. 93, *cornuta*, p. 94, Algeria, Fauv., Rev. d'Ent. v : n. spp.
Oxysoma bedeli, Algeria, Fauv., Rev. d'Ent. v, p. 88, n. sp.
Dinusa hipponensis, Algeria, Fauv., Rev. d'Ent. v, p. 85, n. sp.
Polylobus sodalis, p. 438, *longulus*, *notus*, p. 440, *acceptus*, p. 441, *fungicola*, *obesus*, p. 442, *usitatus*, p. 443, Australia, *tasmanicus*, Tasmania, p. 444, Oll., P. Linn. Soc. N.S.W. (2) i : n. spp.
Lomechusa strumosa, Fab., habits; Wasman, Deutsche e. Z. xxx, pp. 55-57.
Lomechusa teres, Caspian region, Eppesh., Radde Faun. Casp. p. 182; *L. montana*, California, Casey, Bull. Cal. Ac. Sci. ii, p. 202 : n. spp.
Atemeles emarginatus, Gr., habits; Wasman, Deutsche e. Z. xxx, pp. 50-55.
Dabra, n. g., p. 452, near *Dinarda*, for *D. myrmecophila*, p. 453, pl. vii, fig. 2, *cuneiformis*, p. 454, Australia, n. spp.; Oll., P. Linn. Soc. N.S.W. (2) i.
Dinarda dentata, Gr., habits; Wasman, Deutsche e. Z. xxx, pp. 57-59.
Pelioptera astuta, Tasmania, Oll., P. Linn. Soc. N.S.W. (2) i, p. 424, n. sp.
Apiphiana, n. g., p. 421, near *Pelioptera*, for *A. veris*, Australia, n. sp., p. 422, pl. vii, fig. 1; Oll., P. Linn. Soc. N.S.W. (2) i.
Pella, Steph., = (*Myrmedonia*, auct.); Goz., Recherche, p. 12.
Myrmedonia funesta, Gr., habits; Wasman, Deutsche e. Z. xxx, pp. 61-63.
Myrmedonia cinctipennis, Talysch, Eppesh., Radde, Faun. Casp. p. 183, n. sp.
Calodera algophila, New Zealand, Broun; Man. N. Z. Col. p. 941; *C. carissima*, Tasmania, p. 426, *pyrrha*, *eritima*, p. 429, *uglaophanes*, p. 430, Australia, *simsoni*, *pachia*, p. 432, *atypha*, p. 433, Tasmania, Oll., P. Linn. Soc. N.S.W. (2) i : n. spp.
Ilyobates californicus and *nigrinus*, Casey, belong to *Bolitochara*; Casey, Bull. Cal. Ac. Sci. ii, p. 260.
Tachyusa crebrepunctata, California, Casey, Bull. Cal. Ac. Sci. ii, p. 203, n. sp.
Mataris, n. g., near *Tachyusa*, p. 112, for *M. grouvellei*, Antibes, n. sp., p. 112; Fauv., Rev. d'Ent. v.
Oxyopoda erythroceras, p. 184, *caspia*, p. 185, Caspian Region, Eppesh., Radde Faun. Casp.; *O. caloderina*, Algeria, *apicalis*, Syria, p. 77, *signifera*, Tunis, p. 78, *rugifera*, Algeria, p. 79, Fauv., Rev. d'Ent. v : n. spp.

Ousipalia, n. n. for *Sipalia*, Th. (nec Muls.); Goz., Recherche, p. 13.

Homalota, Mann., = (*Epipeda*, Rey); Goz., Recherche, p. 12.

Homalota rugata, Algeria, Spain, Fauv., Rev. d'Ent. v, p. 72; *H. (Aleunota) mirabilis*, Talysch, Eppelsh., Radde Faun. Casp. p. 186; *H. (Atheta) approximans*, p. 34, *rudiventris*, p. 35, Amur land, Eppelsh., Deutsche e. Z. xxx; *H. molesta*, Australia, p. 415, *atyphella*, Australia, and Tasmania, *psila*, p. 416, *chariessa*, p. 418, *indefessa*, p. 420, Tasmania, Oll., P. Linn. Soc. N.S.W. (2) i: n. spp.

Alianta porosa, Spain, Algeria, Fauv., Rev. d'Ent. v, p. 83, n. sp.

Tachyporides.

Xenidus, n. g., near *Hypocyptus*, p. 254, for *X. retractus*, n. sp. (in tobacco from Sumatra), p. 255; Rey, Rev. d'Ent.

Typhlopanemys, n. g., near *Hypocyptus*, p. 252, for *T. hypogæa*, Syria, n. sp., p. 253; Rey, Rev. d'Ent. v.

Hypocyptus giganteus, p. 65, *laxipunctatus*, p. 66, Algeria, Fauv., Rev. d'Ent. v, n. spp.

Eumitocerus, n. g., near *Habrocerus*, p. 206, for *E. tarsalis*, California, n. sp., p. 207, pl. vii, fig. 3; Casey, Bull. Cal. Ac. Sci. ii.

Cilea lampra, Australia, Oll., P. Linn. Soc. N.S.W. (2) i, p. 900, n. sp.

Coproporus? *pumilio*, Lenkoran, Eppelsh., Radde Faun. Casp. p. 188, n. sp.

Tachinus, Gr., = (*Bolitobius*, auct.); Goz., Recherche, p. 13.

Hamotrako, n. n. for *Tachinus*, auct.; Goz., Recherche, p. 13.

Tachyporus vigilans, Tasmania, Oll., P. Linn. Soc. N.S.W. (2) i, p. 899, n. sp.

Bolitobius fauveli, p. 905, *sharpi*, p. 906, Australia, Oll., P. Linn. Soc. N.S.W. (2) i, n. spp.

Bryoporus vittatus, Caspian region, Eppelsh., Radde Faun. Casp. p. 190, n. sp.

Mycetoporus americanus and *flavicollis*, ♂ characters; Schwarz, Ent. Am. ii, p. 137.

Mycetoporus additus, Amur land, Eppelsh., Deutsche e. Z. xxx, p. 38, n. sp.

Carphacis, n. n. for *Megacronus*, Th. Fauv.; Goz., Recherche, p. 14.

Myteroxis, n. n. for *Ischnosoma*, Th. Fauv.; Goz., Recherche, p. 14.

Conosoma activum, Tasmania, p. 891, *phozum*, *ambiguum*, p. 894, *caximium*, Australia, *enixum*, Australia and Tasmania, p. 896, Oll., P. Linn. Soc. N.S.W. (2) i; *Conurus nigropictus*, Talysch, Eppelsh., Radde Faun. Casp. p. 189; *C. humeralis*, Amur land, Eppelsh., B. E. Z. xxx, p. 36: n. spp.

Staphylinides.

Casioquedus, n. g. of *Quediina*, p. 376, for *C. gularis*, New Zealand, n. sp., p. 377, pl. xii, fig. 13; Sharp, Tr. R. Dublin Soc. (2) iii.

Quedius fulgidus and *peregrinus*, note on; Hamilton, Canad. Ent. xviii, p. 111. *Q. vernie* and *ferox*, Lec., characters of; Schwarz, P. E. S. Wash. i, p. 9.

Quedius duplex, p. 58, *punctifrons*, p. 59, Algeria, Fauv., Rev. d'Ent. v ; *Q. fasciculatus*, Amur land, Eppelsh., Deutsche e. Z. xxx, p. 39 ; *Q. antipodum*, *edwardsi*, p. 378, *insolitus*, pl. xii, fig. 12, *latifrons*, p. 379, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii : n. spp.

Heterothops occidentis (p. 263), California, Casey, Bull. Cal. Ac. Sci. ii, p. 208, n. sp.

Philonthus subvirescens, Th., specific characters of ; Bull. Soc. Ent. Fr. (6) vi, p. x.

Cafius caviceps, N. Zealand, Broun, Man. N. Z. Col. p. 942, n. sp.

Staphylinus, L., = (*Emus*, Curt.) ; Goz., Recherche, p. 14.

Dinothenarus, n. n. for *Staphylinus*, auct. ; Goz., Recherche, p. 14. *Ouchemus*, n. subg. of *Dinothenarus* ; *id. t. c.*

Staphylinus litoreus and *maritimus*, Broun, referred to *Cafius* ; Broun, Man. N. Z. Col. p. 942. *S. olens*, metamorphosis ; Pissot, Bull. Soc. Ent. Fr. (6) vi, p. cxc.

Staphylinus luzonicus, Philippines, Fauv., Ann. Soc. Ent. Fr. (6) vi, p. 180, and Rev. d'Ent. v, p. 149, n. sp.

Creophilus maxillosus : *Altysia manducator* is a parasite of ; P. S. Lond. E. S. 1886, p. 25 : destroyed by *Proctotrupes ater* ; Ent. xix, p. 225.

Ocypus cupreus, tarsal hairs, p. 239, pl. xii, fig. 8 ; Dahl (133).

Ocypus (Anodus) rufipes, Lenkoran, Eppelsh., Radde Faun. Casp. p. 191, n. sp.

Xantholinus ochraceus and *atratus*, specific characters of, given by Th. ; Bull. Soc. Ent. Fr. (6) vi, p. x. *X. hesperius*, Er., = (*coloratus*, Karsch) ; Fauv., Rev. d'Ent. v, p. 49.

Leptucinus brunneus, Lec, ?, sexual character of ; Casey, Bull. Cal. Ac. Sci. ii, p. 261, pl. viii, fig. 4a.

Pæderides.

The N. American genera of *Pæderidae* tabulated ; Casey, Bull. Cal. Ac. Sci. ii, p. 228, &c.

Cryptobium koltzei, Amur land, Eppelsh., Deutsche e. Z. xxx, p. 40, n. sp.

Hesperobium, n. g. for the N. American species of *Cryptobium* ; Casey, Bull. Cal. Ac. Sci. ii, pp. 33-36.

Ababactus, characters supplemented ; Casey, Bull. Cal. Ac. Sci. ii, p. 211. *A. pallidiceps*, California, *id. t. c.* p. 209, n. sp.

Domene procera, Amur land, Eppelsh., Deutsche e. Z. xxx, p. 41, n. sp.

Phanophilus, n. g. near *Domene*, for *Lithocharis comptus*, Broun ; Sharp, Tr. R. Dublin Soc. (2) iii, p. 380.

Lathrobium, Gr., = (*Lobrathium*, Rey) ; Goz., Recherche, p. 14.

Bathrobium, n. n. for *Lathrobium*, Rey ; Goz., Recherche, p. 14.

Lathrobium prolatum, Philippines, Fauv., Rev. d'Ent. v, p. 148, and Ann. Soc. Ent. Fr. (6) vi, p. 180 ; *L. impressifrons*, p. 192, *lederi*, p. 193, Talysch, Eppelsh., Radde Faun. Casp ; *L. mexicanum*, Mexico, *clandestinum*, Guatemala, p. 537, *relictum*, Mexico and Guatemala, p. 538, Sharp, Biol. Centr. Am. Col. i, pt. 2 : n. sp.

Dolicoon nigricollis, Woll., = (*Lath. artus*, Karsch) ; Fauv., Rev. d'Ent. v, p. 41.

Dolicaon sparsiventris, Philippines, Fauv., Rev. d'Ent. v, p. 148, and Ann. Soc. Ent. Fr. (6) vi, p. 179; *D. punctiger*, N. Africa, Fauv., Rev. d'Ent. v, p. 42: n. sp.

Achenium myops, Algeria, *cribriceps*, Cairo, Fauv., Rev. d'Ent. v, p. 45, n. spp.

Scopæomerus, n. g., p. 538, for *S. chiriquensis*, Panama, pl. xiv, fig. 2, *guatemalenus*, Guatemala, *palmatus*, p. 539, *obscurus*, p. 540, Panama, Sharp, Biol. Centr. Am. Col. i, pt. 2, n. spp.

Scopæus rotundiceps, p. 217, *truncaticeps*, p. 219, California, Casey, Bull. Cal. Ac. Sci. ii; *S. ligulifer*, p. 540, *latitarsis vilis*, p. 541, Panama, *apicicornis*, *filum*, *concolor*, Guatemala, p. 542, *salvini*, Guatemala and Panama, pl. xiv, fig. 4, *obscurus*, *piceolus*, p. 543, *brevipennis*, *umbra*, Guatemala, *dissimilis*, Panama, pl. xvi, fig. 5, p. 544, *antoniensis*, pl. xiv, fig. 6, *mollis*, *carissimus*, p. 545, *politus*, pl. xiv, fig. 8, *discoidalis*, p. 546, Guatemala, *filitarsis*, Mexico, *apicipennis*, pl. xiv, fig. 7, p. 547, *delicatulus*, Guatemala, Panama, p. 548, Sharp, Biol. Centr. Am. Col.: n. spp.

Scopwodera, n. g., pp. 217 & 220, for *Scopæus nitidus*, Lec., *pulchellus*, Er., and *Scopæus*, group 4 of Biol. Cent. Am. Col. i, pt. 2; Casey, Bull. Cal. Ac. Sci. ii.

Euscopæus, n. g., p. 548, for *E. crassitarsis*, *gracilicornis*, pl. xiv, fig. 9, Guatemala, n. spp.; Sharp, Biol. Centr. Am. p. 548.

Orus, Casey, characters corrected; Casey, Bull. Cal. Ac. Sci. ii, pp. 36 & 226: its position is near *Scopæus*; Sharp, Biol. Centr. Am. Col. i, pt. 2, p. 549.

Orus parallelus, California, Casey, Bull. Cal. Ac. Sci. ii, p. 227; *O. guatemalenus*, Guatemala, pl. xiv, fig. 3, p. 549, Sharp, t. c.: n. spp.

Leptorus, n. g., pp. 217 & 220, for *L. texanus*, p. 221, *bicolor*, p. 222, *versicolor*, *longiceps*, p. 224, Texas, n. spp., and to include *Scopæus exiguus*, Er., *picipes*, Casey, and *S. filum*, *concolor*, *salvini*, *obscurus*, *piceolus*, *brevipennis*, Sharp; Casey, Bull. Cal. Ac. Sci. ii.

Lithocharis, characters of, discussed; Sharp, Biol. Centr. Am. Col. i (2) p. 549.

Lithocharis mendax, Nicaragua to Colombia, p. 550, *hilaris*, Guatemala, pl. xiv, fig. 11, *discoidalis*, Panama, p. 551, *alticola*, Guatemala, p. 552, *id. t. c.*; *L. sinuato-collis*, p. 14, *convergens*, p. 15, *lepida*, p. 16, *puberula*, p. 17, *malaca*, p. 18, *latiuscula*, p. 19, *sublesta*, *consanguinea*, p. 21, *contigua*, p. 22, *luctuosa*, p. 24, *retrusa*, p. 25, *gregalis*, p. 26, *mimula*, p. 27, *languida*, p. 28, California; Casey, Bull. Cal. Ac. Sci. ii. [These species referred to *Medon*, *id. t. c.* p. 231.]: n. spp.

Metaxyodonta, n. g., p. 29, for *M. alutacea*, p. 30, *quadracollis*, p. 31, California, n. sp., Casey, Bull. Cal. Ac. Sci. ii (cf. *Lithocharis*).

Lithocharis, Lac., = (*Metaxyodonta*, Casey); Casey, Bull. Cal. Ac. Sci. ii, p. 232.

Caloderma, n. g., near *Lithocharis*, p. 5, for *C. rugosum*, p. 5, *continens*, p. 6, *angulatum*, p. 7, *mobile*, p. 8, *contractum*, p. 9, *luculentum*, p. 10, *reductum*, p. 11, *tantillum*, p. 12, n. spp., California; Casey, Bull. Cal. Ac. Sci. ii (also t. c. p. 230).

Oligopteris, n. g., near *Lithocharis*, p. 12, for *O. cuneicollis*, California, n. sp., p. 13; Casey, Bull. Cal. Ac. Sci. ii (also t. c. p. 231).

Aderocharis, n. g., p. 552, to include *Lithocharis latro*, Shp. (figured pl. xiv, fig. 10), *corticina*, Gr., *hepatica*, Er., and *A. furtiva*, Mexico to Panama, *sagax*, Guatemala, n. spp., p. 553; Sharp, Biol. Centr. Am. Col. i (2).

Dachnochilus letus, Lec., figured, pl. xiv, fig. 12; Sharp, Biol. Centr. Am. Col. i (2).

Acalophaena, n. n. for *Calophaena*, Arrib., nec Klug, p. 554, *A. angularis*, Er., figured, pl. xiv, fig. 13; Sharp, Biol. Centr. Am. Col. i (2).

Lithocaon, n. g., p. 555, for *L. sparsus*, Panama, n. sp., pl. xiv, fig. 14; Sharp, Biol. Centr. Am. Col. i (2).

Trachysectus, n. g., for *Lathrobium confluentis*, Say; Casey, Bull. Cal. Ac. Sci. ii, p. 32.

Lypeticus, n. g., p. 556, for *Lithocharis munda*, Sharp, and *L. celatus*, Guatemala, n. sp.; Sharp, Biol. Centr. Am. Col. i (2).

Neomedon, n. g., p. 557, for *N. princeps*, Guatemala, pl. xiv, fig. 15, *rufipennis*, p. 557, *sallei*, *mexicanus*, *mollis*, p. 558, *densus*, *flohri*, Mexico, *nigricans*, Guatemala, *puncticeps*, Mexico, Guatemala, p. 559, Sharp, Biol. Centr. Am. Col. i (2): n. spp.

Ramona, n. g., near *Medon*, for *R. capitulum*, N. America, n. sp.; Casey, Bull. Cal. Ac. Sci. ii, p. 213.

Lena, n. g., near *Medon*, p. 211, for *L. testacea*, Texas, n. sp., p. 212; Casey, Bull. Cal. Ac. Sci. ii.

Medon peregrinus, Guelma, Fauv., Rev. d'Ent. v, p. 39, n. sp.

Mespalerus, n. g., p. 560, for *M. praevius*, *flavipennis*, pl. xiv, fig. 16, *debilis*, p. 560, *piesticulus*, Guatemala, p. 561, n. spp.; Sharp, Biol. Centr. Am. Col. i (2).

Scioporus, n. g., near *Medon*, p. 561, for *S. brunneus*, Guatemala, Nicaragua, p. 561, *fulvescens*, Panama, pl. xiv, fig. 17, *signatus*, pl. xiv, fig. 18, *sellatus*, Guatemala, p. 562, *apicipennis*, *obsoletus*, Panama, *chontalenus*, Nicaragua, p. 563, *parvidens*, Guatemala, *latifrons*, Panama, *breviceps*, Rio Janeiro, p. 564, Sharp, Biol. Centr. Am. Col. i (2), n. spp.

Stilomedon, n. g., p. 565, to include *Lithocharis biseriata*, Er., and *L. discedens*, Sharp, also *S. triseriatus*, Panama, pl. xiv, fig. 20, p. 565, *strigicollis*, Mexico to Panama, p. 566, *verticalis*, Panama, p. 567, n. spp.; Sharp, Biol. Centr. Am. Col. i (2).

Ophiomedon, n. g., p. 567, for *O. stipes*, Guatemala, Nicaragua, pl. xiv, fig. 21, p. 567, *longiceps*, *subtilis*, *longulus*, Panama, p. 568, n. spp.; also *Lithocharis integra* and *compressa*, Sharp; Sharp, Biol. Centr. Am. Col. i (2).

Monocharis, n. g., p. 569, for *Lithocharis vestita*, Sharp, which is figured, pl. xiv, fig. 22; Sharp, Biol. Centr. Am. Col. i (2).

Sciocharis arribalzae, Guatemala, pl. xiv, fig. 23, *nigriceps*, Guatemala, Panama, *cognata*, Guatemala, p. 570, *similaris*, Guatemala, *capitata*, p. 571, *subnitens*, Panama, *testacea*, Guatemala and Nicaragua, *nitidicollis*, Panama, p. 572, *championi*, Guatemala, Panama, *densicollis*, Panama, *gregaria*, Guatemala, p. 573, *fragilis*, Guatemala, *minuta*, *boops*, *juno*, p. 574, *perdita*, *flavipennis*, p. 575, Panama, Sharp, Biol. Centr. Am. Col. i (2): n. spp.

Eusclerus, n. g., p. 575, for *E. rugifrons*, pl. xiv, fig. 25, *sordidus*, Guatemala, n. spp., p. 576; Sharp, Biol. Centr. Am. Col. i (2).

Stilocharis, n. g., p. 576, for *S. longula*, Guatemala, n. sp., pl. xv, fig. 1, p. 577; Sharp, Biol. Centr. Am. Col. i (2).

Deroderus, n. g., p. 577, for *D. vestitus*, Panama, pl. xv, fig. 2, p. 577, *punctipennis*, *latipes*, Guatemala, *difficilis*, Mexico, pl. xv, fig. 3, p. 578, n. spp.; Sharp, Biol. Centr. Am. Col. i (2).

Eustilicus, n. g., p. 579, for *E. crassidens*, Guatemala, pl. xv, fig. 4, *orbifer*, Panama, p. 579, *mexicanus*, Mexico, *gracilis*, Guatemala, p. 580, n. spp.; Sharp, Biol. Centr. Am. Col. i (2).

Trochoderus, n. g., p. 580, for *T. godmani*, pl. xv, fig. 5, *dubius*, Guatemala, n. spp., p. 581; Sharp, Biol. Centr. Am. Col. i (2).

Stilicus cribratus, Mexico to Panama, pl. xv, fig. 7, *guatemalensis*, Guatemala, p. 582, *cribripennis*, Mexico, Guatemala, *nimborum*, *femoratus*, Guatemala, p. 583, *simplex*, Guatemala, *chiriquensis*, *rugicollis*, Panama, p. 584, *bidens*, Guatemala, *muticus*, Panama, pl. xv, fig. 8, p. 585, *dissimilis*, Guatemala, p. 586, Sharp, Biol. Centr. Am. Col. i (2), n. spp.

Suniocharis, n. g., p. 586, for *S. modesta*, Mexico to Panama, pl. xv, fig. 9, p. 586, *nigrescens*, Guatemala, *fragilis*, Mexico, p. 587, n. spp.; Sharp, Biol. Centr. Am. Col. i (2).

Suniotrichus, n. g., p. 587, for *S. capillaris*, pl. xv, fig. 10, *sordidus*, Guatemala, *puncticollis*, Panama, p. 588, n. spp., Sharp, Biol. Centr. Am. Col. i (2).

Monista concolor, Guatemala to Panama, pl. xv, fig. 11, p. 589, *similis*, Guatemala, *plagiata*, *strigicollis*, Panama, p. 590, *diffinis*, Guatemala, *picturata*, Panama, pl. xv, fig. 12, p. 591, Sharp, Biol. Centr. Am. Col. i (2), n. spp.

Echiaster solitarius, Panama, *filum*, Guatemala, Nicaragua, pl. xv, fig. 13, *orbifer*, Panama, p. 592, *minutus*, Guatemala, Nicaragua, *championi*, Guatemala, pl. xv, fig. 14, *funebri*, Panama, p. 593, *curtus*, *lativentris*, pl. xv, fig. 15, Guatemala, p. 594, Sharp, Biol. Centr. Am. Col. i (2), n. spp.

Zonaster, n. g., for *Z. optatus*, Panama, n. sp.; Sharp, Biol. Centr. Am. Col. i (2) p. 595.

Leptogenius, n. g., affinities doubtful, p. 214, for *L. brevicornis*, Texas, n. sp., p. 215, pl. vii, fig. 6; Casey, Bull. Cal. Ac. Sci. ii.

Astenus, Steph., = (*Sunius*, auct.) ; Goz., Recherche, p. 14.

Stilicopsis, Sachse, = (*Acanthoglossa*, Kr.), *S. (Sunius) brevis*, Sharp, figured, pl. xv, fig. 23; Biol. Centr. Am. Col. i (2).

Dibelonetes, Sahl., to be used for a portion of *Sunius*, Er., *Sunides*, Motsch., being a section thereof; Sharp, Biol. Centr. Am. Col. i (2), p. 601. *D. biplagiatus*, Sahl., figured, pl. xv, fig. 20; t. c. *D. fragilis*, Panama, p. 602, *pallipes*, Guatemala, Nicaragua, *laticeps*, Panama, pl. xv, fig. 21, *robustus*, Guatemala, p. 603, *posticalis*, Guatemala, *panamensis*, p. 604, *pictipes*, Panama, *occultus*, Guatemala, p. 605, *latitans*, Guatemala to Panama, p. 606, id. t. c.: n. spp.

Sunius melanopygus, Amur land, Eppelsh., Deutsche e. Z. xxx, p. 42; *S. longinusus*, pl. xv, fig. 17, *cognatus*, p. 596, Panama, *vilis*, Guatemala, *filiventris*, p. 597, *substrictus*, Panama, *subtilis*, *signatellus*, Mexico, p. 598, *centralis*, Panama, *pilatei*, Mexico, Guatemala, pl. xv, fig. 18, p. 599, *sacatus*, *tenuis*, pl. xv, fig. 19, *opaculus*, Guatemala, p. 600, *cinctiventris*, Mexico to Panama, p. 601, Sharp, Biol. Centr. Am. Col. i (2): n. spp.

Stannoderus, n. g., p. 607, to include *Surius labeo*, Er., and *insignis*, Sharp, and *S. championi*, pl. xv, fig. 24, *sallei*, p. 607, *optatus*, *gracilis*, Guatemala, *godmani*, Panama, pl. xv, fig. 25, p. 608: n. spp.; Sharp, Biol. Centr. Am. Col. i (2).

Pæderus chilensis, Fauv., is from the Asiatic Archipelago, not Chili; Fauv., Rev. d'Ent. v, p. 148.

Pæderus gottschei, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 179, pl. xi, fig. 23; *P. alticola*, Guatemala, pl. xvi, fig. 1, p. 609, *luridiventris*, Panama, pl. xvi, fig. 2, *testaceitarsis*, Mexico, p. 610, *currax*, *latipes*, pl. xvi, fig. 3, Mexico, *velox*, Guatemala, p. 611, *filicornis*, Mexico, p. 612, *signaticornis*, Mexico to Nicaragua, p. 613, *yucateca*, Mexico to Costa Rica, pl. xvi, fig. 6, p. 614, *antiquus*, Mexico, *arduus*, Panama, *antoniensis*, Guatemala, p. 615, *cordovens*, Mexico, *costaricensis*, Costa Rica, p. 616, *apicalis*, Mexico to Nicaragua, pl. xvi, fig. 8, p. 617, *pallidus*, Guatemala, p. 618, Sharp, Biol. Centr. Am. Col. i. (2) : n. spp.

Pinophilides.

Tenodemus stigmaticum, Guatemala, pl. xvi, fig. 9, p. 618, *ornatum*, Mexico, pl. xvi, fig. 10, *nigripes*, Mexico, Guatemala, *hemorrhoidale*, Panama, pl. xvi, fig. 11, p. 619, *filiforme*, Panama, *tibiale*, Nicaragua, pl. xvi, fig. 12, p. 620, Sharp, Biol. Centr. Am. Col. i (2), n. spp.

Pinophilus, habits of the species; Casey, Bull. Cal. Ac. Sci. ii, p. 262.

Pinophilus erythropterus, Mexico to Costa Rica, p. 621, *sejunctus*, Guatemala, *parviceps*, Mexico, *panamensis*, Panama, p. 622, *guatemalensis*, Guatemala, *iners*, Panama, p. 623, *lineaticollis*, *fragilicornis*, *opacicornis*, *penetrans*, pl. xvi, fig. 14, p. 624, *reflexus*, Panama, *basiventris*, British Honduras, Guatemala, p. 625, *agilis*, Panama, pl. xvi, fig. 16, *validus*, Mexico to Nicaragua, p. 626, *cribricollis*, Guatemala, *parvicornis*, *longicornis*, pl. xvi, fig. 15, Panama, p. 627, Sharp, Biol. Centr. Am. Col. i (2), n. spp.

Aræocerus, Nord., treated as valid genus; Sharp, Biol. Centr. Am. Col. i (2), p. 628.

Lathropinus, n. g. for a portion of *Pinophilus*, *L. parallelus*, Mexico, pl. xvi, fig. 17, n. sp.; Sharp, Biol. Centr. Am. Col. i (2), p. 628.

Heteroleucus, n. g., p. 629, to include *Pinophilus brevicollis*, Er., *P. abax* and *egens*, Sharp, and *H. marginatus*, Guatemala, pl. xvi, fig. 18, p. 629, *mexicanus*, Mexico and Guatemala, p. 630, Sharp, Biol. Centr. Am. Col. i (2), n. spp.

Edodactylus fauveli, Mexico, pl. xvi, fig. 19, p. 630, Sharp, Biol. Centr. Am. Col. i (2), n. sp.

Procirrus aristidis, Egypt, Fauv., Rev. d'Ent. v, p. 33, n. sp.

Palaminus lacertinus, Guatemala, pl. xvi, fig. 20, *parviceps*, Mexico, p. 631, *longicollis*, *validus*, *cognatus*, Panama, p. 632, *crenatus*, Guatemala, *insignis*, p. 633, *gracilipes*, Panama, *fusciventris*, Nicaragua, *sordidus*, p. 634, *mexicanus*, Mexico, *concolor*, pl. xvi, fig. 21, Guatemala; *rubripennis*, Panama, pl. xvi, fig. 22, p. 635, *palmatus*, Panama, *apicipennis*, Guatemala, pl. xvi, fig. 23, p. 636, *parvulus*, Mexico, *deformis*, Mexico, Guatemala, pl. xvi, fig. 24, *chiriquensis*, Panama, p. 637, *filum*, British Honduras, Nicaragua, *debilis*, p. 638, *vittatus*, Nicaragua, pl. xvi, fig. 25, *humeralis*, Mexico, *diffinis*, Nicaragua, p. 639, Sharp, Biol. Centr. Am. Col. i (2), n. spp.

Stenides.

Eccesthethinæ : *Stenæsthetus*, Shp., *Ctenomastax*, Kr., and *Tirellus*, Sharp, assigned to this group; Sharp, Biol. Centr. Am. Col. i (2), p. 640.

Edaphus euplectoides, Guatemala, pl. xvii, fig. 1, p. 640, Sharp, Biol. Centr. Am. Col. i (2), n. sp.

Nestus, *Tesnus*, *Mesostenus*, *Hypostenus*, n. subgg. of *Stenus*; Rey, Ann. Soc. L. Lyon, xxx, p. 183.

Stenus, labium of; Meinert (436). Note on European and N. American *Steni*; Casey, Bull. Cal. Ac. Sci. ii, p. 261. *S. flavipes*, Steph., = (*dobberti*, Qued.); Fauv., Rev. d'Ent. v, p. 31. *S. pumilio*, Er., = (*atomarius*, Casey), *humilis*, Er., = (*mammops*, Casey), *morio*, Gr., = (*subgriseus*, Casey), *tarsalis*, Ljungh., = (*reconditus*, Casey); Horn, Tr. Am. Ent. Soc. xiii, p. xiii; but cf. Casey, Bull. Cal. Ac. Sci. ii, pp. 261 & 262.

Stenus aniceps, Appenines, p. 192, *S. adjunctus*, Europe (? n. sp., ? the same as *punctipennis*, Th.), p. 214, *simplex*, Turin, p. 236, *cribrellus*, *discretus*, France (? n. spp.), p. 261, *transfuga*, Appenines, p. 282, *relucens*, Algeria (? n. sp.), p. 292, *altifrons*, Turin, p. 302, *subconvexus*, Algeria, p. 370, Ann. Soc. L. Lyon, xxx, more or less doubtfully described as n. spp.

Stenus erythrocnemus, Lenkoran, Eppelsh., Radde Faun. Casp. p. 195; *S. amurensis*, p. 43, *conformis*, p. 44, Amur-land, Eppelsh., B. E. Z. xxx; *S. velocipes*, Philippines, Fauv., Rev. d'Ent. v, p. 146, and Ann. Soc. Ent. Fr. (6) vi, p. 179; *S. fortis*, p. 230, (*Nestus*) *notatus*, p. 255, *longipennis*, p. 268, *foveifrons*, p. 272, *albipilus*, p. 275, France, n. spp., Rey, Ann. Soc. L. Lyon, xxx; *S. sallæi*, Mexico, p. 641, *championi*, Mexico to Panama, pl. xvii, fig. 3, *inermis*, Guatemala, p. 642, *graciliventris*, Guatemala, Panama, pl. xvii, fig. 4, *hostilis*, Mexico to Panama, p. 643, *mexicanus*, Mexico, *nimborum*, Guatemala, *mucronatus*, Panama, p. 644, *zunilensis*, Guatemala, *corrosus*, *punctiventris*, Panama, p. 645, *repletus*, Guatemala, pl. xvii, fig. 5, *fauvelianus*, Mexico to Panama, pl. xvii, fig. 6, p. 646, *macilentus*, *solitarius*, Guatemala, *sobrinus*, Panama, p. 647, *buccalis*, Nicaragua, *nasutus*, Panama, pl. xvii, fig. 7, *scabrosus*, Mexico, Guatemala, p. 648, *trochanterinus*, Panama, pl. xvii, fig. 8, *scabripennis*, Mexico to Panama, p. 649, *longiventris*, *densipennis*, *ornativentris*, Panama, p. 650, *consimilis*, Mexico, pl. xvii, fig. 9, *leucopus*, Mexico, Guatemala, p. 651, *alticola*, *incognitus*, Guatemala, p. 652, *docilis*, pl. xvii, fig. 10, *bajulus*, Guatemala, p. 653, *alumnus*, Mexico, Guatemala, *addendus*, Guatemala, p. 654, *segnis*, Panama, *eremitus*, Mexico, p. 655, *micans*, Guatemala, *inanis*, *peregrinus*, Panama, p. 656, *ambulator*, *gentilis*, pl. xvii, fig. 11, Guatemala, p. 657, *megops*, Panama, *letipes*, *laceratus*, Mexico, p. 658, *asperatus*, Guatemala, *salvini*, pl. xvii, fig. 12, Panama, *remotus*, Guatemala, p. 659, *scutiger*, Panama, *exulans*, p. 660, *aculeatus*, pl. xvii, fig. 14, Guatemala, *armatus*, Panama, p. 661, *godmani*, Mexico, Guatemala, pl. xvii, fig. 13, *cribriceps*, Nicaragua, Panama, pl. xvii, fig. 15, p. 662, *chiriquensis*, Panama, *cylindricus*, Mexico to Panama, *placidus*, Panama, p. 663, *albipes*, Mexico to Nicaragua, *cylindricollis*, British Honduras, p. 664, *detector*, Panama, *guatemalensis*, Guatemala, *sagax*, Guatemala, Panama, pl. xvii, fig. 16, p. 665, *chontalenus*, Nicaragua, *deceptor*, Guatemala, *flöhri*, Mexico, p. 666, *suaveolus*, Guatemala, *podagricus*, Nicaragua, pl. xvii, fig. 17, p. 667, Sharp, Biol. Centr. Am. Col. i (2) : n. spp.

Oxytelides.

Megalopinae: subfamily proposed for the genus *Megalops*, Sharp, Biol. Centr. Am. Col. i (2) p. 667; *M. cruciger*, Mexico to Panama, pl. xvii, fig. 18, p. 668, *mexicanus*, Mexico, *adjectus*, p. 669, *morosus*, Guatemala, Panama, *armatus*, Panama, p. 670, *modestus*, Panama, *ineptus*, *integer*, pl. xvii, fig. 19, Guatemala, p. 671, *cognatus*, *elegans*, pl. xvii, fig. 20, *præditus*, pl. xvii, fig. 21, Panama, p. 672: n. spp.; Sharp, Biol. Centr. Am. Col. i (2).

Bledius capra, Fauv., (= *giraffa*, Costa); Fauv., Rev. d'Ent. v, p. 24.

Bledius hoplites, Philippines, &c., Fauv., Rev. d'Ent. v, p. 146, and Ann. Soc. Ent. Fr. (6) vi, p. 178, n. sp.

Stylozyx, n. n. for *Oxytelus*, Thoms.; Goz., Recherche, p. 15.

Oxytelus celebensis, Manilla, &c.; Fauv., Rev. d'Ent. v, p. 145, and Ann. Soc. Ent. Fr. (6) vi, p. 178, n. sp.

Coprostygnus, n. g. near *Coprophilus*, for *C. sculptipennis*, New Zealand, n. sp., pl. xii, fig. 14; Sharp, Tr. R. Dublin Soc. (2) iii.

Planeustomus microphthalmus, Algeria, Fauv., Rev. d'Ent. p. 17, n. sp.

Misancyrus, n. g., for *Ancyrophorus emarginatus*, Fauv.; Goz., Recherche, p. 15.

Amisanummus, n. n., for *Carpalimus*, Rey; Goz., Recherche, p. 14.

Trogophlaeus xiomensis, Trop. Asia, Fauv., Rev. d'Ent. v, p. 144, and Ann. Soc. Ent. Fr. (6) vi, p. 178; *T. dilaticollis*, Lenkoran, Eppelsh., Radde Faun. Casp. p. 196: n. spp.

Thinobius heterocerus, Algeria, Fauv., Rev. d'Ent. v, p. 18; *T. (Thinophilus) nodicornis*, Lenkoran, Eppelsh., Radde Faun. Casp. p. 196: n. spp.

Apocellus niger, Texas, Casey, Bull. Cal. Ac. Sci. ii, p. 232, n. sp.

Homaliides.

Ochthexenus, Motsch., = *Omalium*, Th.; and *Omalium*, Gr., = (*Phleo-stiba*, Th.): Goz., Recherche, p. 16.

Omalium tectum, *genalis*, *politulus*, Broun, referred to *Ischnoderus*; Broun, Man. N. Z. Col. p. 943.

Homalium litoreum, New Zealand, Broun, Man. N. Z. Col. p. 942; *O. sagoloide*, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 381, pl. xii, fig. 15: n. spp.

Phleopterus filicornis, California, Casey, Bull. Cal. Ac. Sci. ii, p. 234, n. sp.

Amphichroum, the N. American species tabulated; Casey, Bull. Cal. Ac. Sci. ii, pp. 240 & 241.

Amphichroum flavicorne, p. 235, *alutaceum*, p. 236, *pilosellum*, p. 237, *veterator*, p. 238, *crassicorne*, p. 239, California, Casey, Bull. Cal. Ac. Sci. ii, n. spp.

Pelecomalium, n. g., near *Amphichroum*, p. 241, for *P. binotatum*, *modestum*, California, n. spp., p. 242; Casey, Bull. Cal. Ac. Sci. ii.

Lathrimæum humerale, California, Casey, Bull. Cal. Ac. Sci. ii, p. 243, pl. vii, fig. 12; *L. longicorne*, Algeria, Fauv., Rev. d'Ent. v, p. 16: n. spp.

Orobanus rufipes, p. 245, pl. vii, fig. 13, *densus*, p. 246, pl. vii, fig. 14, California, Casey, Bull. Cal. Sci. ii, n. spp.

Deliphrum creatoris, n. n. for *D. crenatum*, Gr., auct.; G. z., Recherche, p. 15.

Pycnoglypta heydeni, Amur land; Eppelsh., Deutsche e. Z. xxx, p. 45, n. sp.

Piestides, *Phlæocharides*, *Micropeplides*.

Leptochirus luzonicus, Philippines, Fauv., Rev. d'Ent. v, p. 143, and Ann. Soc. Ent. Fr. (6) vi, p. 179; *L. haackei*, N. Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 142 : n. spp.

Phlæocharis conurella, Algeria; Fauv., Rev. d'Ent. v, p. 11, n. sp.

Micropeplus obsoletus, France; Rey, Ann. Soc. L. Lyon, xxx, p. 169, n. sp.

PSELAPHIDÆ.

[*Of. Broun* (86), *Casey* (118), *Fauvel* (189), *Reitter* (596, 597, 573), *Schaufuss* (632), *Sharp* (655).]

Cyathiger reitteri, Australia; Schauf., Tijdschr. Ent. xxix, p. 242, n. sp.

Chemium antennatum, Reitt., redescribed; Reitt., Radde Faun. Casp. p. 197.

Enoptostomus birmanus, Burma, p. 276, *clandestinus*, Amazons, p. 277, Schauf., Tijdschr. Ent. xxix : n. spp.

Taphrophorus, Schauf., distinct from *Epicaris*, Reitt.; Schauf., Tijdschr. Ent. xxix, p. 274.

Odontalgus vestitus, Sumatra; Schauf., Tijdschr. Ent. xxix, p. 243, n. sp.

Ceophyllus monilis, Lec., habits of; Hamilton, Canad. Ent. xviii, p. 26.

Aplodea, corrected tabulation and synonymy of species of, pp. 271-274; *A. prases*, Chili, n. sp., p. 270, pl. xi, fig. 2; Schauf., Tijdschr. Ent. xxix.

Phamisis, note on the characters of, and on *P. reichenbachi*; Schauf., Tijdschr. Ent. xxix, pp. 266 & 267.

Phamisis horroris, p. 265, *bellus*, p. 267, Brazil, Schauf., Tijdschr. Ent. xxix : n. spp.

Tyromorphus constrictinatus, p. 284, *comes*, p. 285, Australia, Schauf., Tijdschr. Ent. xxix : n. spp.

Rytus procurator, p. 286, *gemmifer*, *orientalis*, p. 287, Australia, Schauf., Tijdschr. Ent. xxix : n. spp.

Durbos, note on, pp. 298-291; *D. interruptus*, Australia, *affinis*, Tasmania, p. 291, *intermedius*, *cribratipennis*, Australia, p. 292, Schauf., Tijdschr. Ent. xxix : n. spp.

Zosimus, n. g., p. 293, for *Z. longipes*, p. 294, *modestus*, *globulicornis*, p. 295, Australia, n. spp., and to include *Gerallus subasper* and *punctipennis*, Schauf.; Schauf., Tijdschr. Ent. xxix.

Metopioxys spiculatus, Amazons; Schauf., Tijdschr. Ent. xxix, p. 278, pl. xi, fig. 3, n. sp.

Batrissus mendocino, *zephyrinus*, p. 175, *speculum*, p. 176, *monticola*, p. 177, *occiduus*, p. 178, California, Casey, Bull. Cal. Ac. Sci. ii : n. spp.

Phalepsus fluminicola, p. 256, *hirsutus*, p. 257, Amazons, Schauf., Tijdschr. Ent. xxix : n. spp.

Bryaxis, the genus discussed and others established at its expense, Casey, Bull. Cal. Ac. Sci. ii, pp. 179-183; *B. iranica*, Sauley, note on, Reitt., Wien. ent. Z. v, p. 347; *B. montana*, Sauley, characters of, *id.* Radde Faun. Casp. p. 201.

Bryaxis spinipes, Lenkoran, Reitt., Radde Faun. Casp. p. 201; *B. texana*, p. 183, *infinita*, p. 184, Texas, Casey, Bull. Cal. Ac. Sci. ii; *B. sylvicola*, p. 919, *fraudulenta*, p. 944, New Zealand, Broun, Man. N. Z. Col.: n. spp.

Reichenbachia tumorosa, p. 186, *tumidicornis*, p. 187, *informis*, p. 189, *gracilicornis*, p. 190, *nevadensis*, p. 191, *fundata*, p. 192, *franciscana*, p. 193, N. America, Casey, Bull. Cal. Ac. Sci. ii: n. spp.

Nisa, n. g., for *Bryaxis luniger*, Lec., and *cavicornis*, Brend.; Casey, Bull. Cal. Ac. Sci. ii, p. 182.

Nisaxis, n. g., for *Bryaxis tomentosa*, Aubé; Casey, Bull. Cal. Ac. Sci. ii, p. 183.

Upoluna, n. g., for *U. flavitarsis*, Upolu island, n. sp.; Schauf., Tijdschr. Ent. xxix.

Harmophorus, n. g., p. 264, near *Batribaxis*, for *H. mantikoroides*, Brazil, n. sp., p. 265; Schauf., Tijdschr. Ent. xxix.

Gonatocerus communis, Schauf., is distinct; Schauf., Tijdschr. Ent. xxix, p. 280.

Gonatocerus tertius, Australia, Schauf., Tijdschr. Ent. xxix, p. 279, n. sp.

Picrogyne, n. n. for *Arcopagus* (Reitt., *nec* Leach); Goz., Recherche, p. 16.

Bythinus difficilis, Sardinia, Reitt., Bull. Soc. Ent. Ital. xviii, p. 30; *B. grilati*, Lyons, Reitt., Wien. ent. Z. v, p. 236; *B. fauconneti*, Central France, Fauv., Rev. d'Ent. v, p. 125: n. spp.

Machaerites dentimanus, Sardinia; Reitt., Bull. Soc. Ent. Ital. xviii, p. 30, n. sp.

Abascantus, n. g., near *Bythinus*, for *A. sannio*, Australia, n. sp.; Schauf., Tijdschr. Ent. xxix, p. 258.

Pselaphus opacus, p. 245, pl. x, fig. 1, *elegantissimus*, fig. 2, *bizonatus*, fig. 3, p. 246, Amazons, *trossulus*, p. 247, Sumatra, *longepilosus*, p. 248, *insignis*, p. 249, *bipunctatus*, p. 250, *frontalis*, p. 251, *tripunctatus*, *squami-ceps*, p. 252, Australia, Schauf., Tijdschr. Ent. xxix; *P. caecus*, *delicatus*, p. 943, *fuscopilus*, p. 944, New Zealand, Broun, Man. N. Z. Col.: n. spp.

Curculionellus bicolor, p. 253, *anopunctatus*, p. 254, *semipolitus*, p. 255, Australia, Schauf., Tijdschr. Ent. xxix., n. spp.

Curculionellus clavicornis, Schauf., note on, with n. var. *vexator*; Schauf., Tijdschr. Ent. xxix, p. 253.

Tyraphus umbilicaris, p. 261, *sobrinus*, p. 262, *proportionalis*, p. 263, Australia, Schauf., Tijdschr. Ent. xxix: n. spp.

Tychus tasmaniae, Tasmania, *politus*, Australia, Schauf., Tijdschr. Ent. xxix, p. 260: n. spp.

Pygoxyon tychioforme, Liguria; Reitt., Bull. Soc. Ent. Ital. xviii, p. 31, n. sp.

Stratus and *Canthoderus* are not the same; Schauf., Tijdschr. Ent. xxix, p. 274.

Actium, n. g., for the Californian species of *Trimium*; Casey, Bull. Cal. Ac. Sci. ii, p. 201.

Euplectomorphus, characters noticed, p. 282; *E. testis*, Ceylon, n. sp., p. 281; Schauf., Tijdschr. Ent. xxix.

Octomicrus verticalis, *interruptus*, Sumatra, Schauf., Tijdschr. Ent. xxix, p. 275: n. spp.

Eutyphlus and *Nicotheus* noticed; Schwarz, P. E. S. Wash. i, p. 28.

Euplecti of Britain tabulated and described; Blatch., Ent. M. M. xxii, pp. 203–209.

Euplectus doderoi, Sardinia, Reitt., Bull. Soc. Ent. Ital. xviii, p. 32; *E. crassipes*, *patruelis*, p. 919, *monticola*, *ovithorax*, p. 929, *obniscus*, *vacuus*, *incomptus*, p. 921, *mirificus*, p. 922, *U-impressus*, *cereus*, p. 923, *eminens*, *auripilus*, p. 945, New Zealand, Broun, Man. N. Z. Col.: n. spp.

Dalmisus, n. g. near *Dalma*, p. 381, for *D. batrisodes*, New Zealand, n. sp., p. 382; Sharp, Tr. R. Dublin Soc. (2) iii.

Oropus, n. g., p. 196, to include *Trichonyx striatus*, Lec., and *O. convexus*, p. 198, *interruptus*, p. 199, *abbreviatus*, p. 200, n. spp., N. America; Casey, Bull. Cal. Ac. Sci. ii.

Sonoma, n. g. near *Sagola*, p. 195, for the species placed by Leconte in *Faronus*; Casey, Bull. Cal. Ac. Sci. ii.

Sagola castanea, *excavata*, p. 884, *sulcator*, *osculans*, p. 885, *foveale*, *elevata*, p. 886, *brevitarsis*, *bipunctata*, p. 887, *duplicata*, *tenuis*, p. 888, *conveza*, p. 889, New Zealand, Broun, Man. N. Z. Col.: n. spp.

PAUSSIDÆ.

[Cf. Dohrn (146), Fairmaire (177), Poll (534), Raffray (576).]

Habits of *Paussidæ*: relations to ants; Perringuey, P. E. Soc. 1886, pp. xxxiv–xxxvii.

Platyrhopalus davidis, Kiang-si; Fairm., Le Nat. viii, p. 224, and Ann. Soc. Ent. Fr. (6) vi, p. 317, n. sp.

Pleuropterus allardi, Senegal; Raff., N. Arch. Mus. (2) ix, p. 15, viii, pl. xix, fig. 1, n. sp.

Paussus (*Platyrhopalus*) *simonis*, China, Dohrn, S. E. Z. xlvii, p. 120; *P. abyssinicus*, figs. 3–5, *planicollis*, figs. 12–16, p. 16, Abyssinia, *arabicus*, Arabia, p. 17, figs. 6–8, *hirsutus*, Abyssinia, p. 18, figs. 9–11, *cephalotes*, Arabia, p. 20, figs. 19 & 20, *fairmairei*, Abyssinia, p. 21, fig. 21, *humbloti*, Madagascar, p. 21, fig. 24, *bicolor*, Andaman Islands, p. 22, fig. 25, *milne-edwardsi*, p. 23, fig. 23, *scyphus*, p. 24, Madagascar, *cyathiger*, p. 26, fig. 22, *laticollis*, p. 27; fig. 26, *penicillatus*, p. 28, fig. 27, *rugosus*, p. 29, fig. 28, *crenaticornis*, p. 30, fig. 29, *recticornis*, p. 33, figs. 32 & 33, Abyssinia, Raff., N. Arch. Mus. viii, pl. xix, and ix: n. sp.

Pentaplatarthrus vandamii, Poll., Notes Leyd. Mus. viii, p. 228, n. sp.

Paussomorphus, n. g. for *P. chevrolati*, W.; Raff., N. Arch. Mus. (2) viii, p. 342.

Arthropterus pallidus, Abyssinia; Raff., N. Arch. Mus. (2) ix, p. 14, viii, pl. xix, fig. 2, n. sp.

SCYDMENIDÆ.

[Cf. Broun (86), Fauvel (191), Reitter (597), Sharp (657).]

Eumicrus angustus, *curtipennis*, p. 49, *cribratus*, p. 50, Japan, Sharp, Ent. M. M. xxiii: n. spp.

Scydmaenus = (*Adrastia*, Broun); Broun, Man. N. Z. Col. p. 925. *S. barnevillei*, Reitt., noticed; Bris., Bull. Soc. Ent. Fr. (6) vi, p. xxix.

Scydmaenus pollens, Japan, Sharp, Ent. M. M. xxiii, p. 49; *S. princeps*, *galerus*, New Zealand, Broun, Man. N. Z. Col. p. 924; *Neuraphes sellatus*, Auvergne, Fauv., Rev. d'Ent. v, p. 316: n. spp.

Euconnus impar, p. 46, *dulcis*, *lewisii*, p. 47, *raucus*, *oscillans*, p. 48, Japan, Sharp, Ent. M. M. xxiii: n. spp.

Phanganophana oreas, *lanosa*, p. 925, *angustata*, p. 926, New Zealand, Broun, Man. N. Z. Col.: n. spp.

Chevrolatia insignis, Duv., = (*bonnairei*, Quedf.); Reitt., Deutsche e. Z. xxx, p. 72.

Cephennium laticolle, Aubé, = (*majus*, Reitt.); Bris., Bull. Soc. Ent. Fr. (6) vi, p. xxix. *C. reitteri*, n. n. for *C. laticolle*, Reitt., nec Aubé; *id. t. c.*

Cephennium punctipenne, France, Fauv., Rev. d'Ent. v, p. 315; *C. (Cephennarium) sardoum*, Sardinia, Reitt., Bull. Soc. Ent. Ital. xviii, p. 32; *C. japonicum*, Japan, Sharp, Ent. M. M. xxiii, p. 50: n. spp.

SILPHIDÆ.

[Cf. Broun (86), Casey (118), Lewis (400), Reitter (594, 573), Sahlberg (628), Sharp (655).]

Note on the number of ventral segments in some genera of; Reitt., Wien. ent. Z. v, p. 347. Reitter defends his "Bestimmungs-Tabellen" of *Necrophaga* against Fauvel; Deutsche e. Z. xxx, pp. 219-224. The cave *Silphidæ* reclassified; Reitt., Wien. ent. Z. v, pp. 313-315. *Necrophorus* and *Necrodes*, tarsal suckers in; Pero, Boll. Mus. Tor. i, No. 13.

Necrophilus subterraneus, Dahl, early stages and development; Ent. Nachr. xii, pp. 209-213.

Silpha obscura, motor nerves of; Gabbi, Bull. Soc. Ent. Ital. xviii, p. 32, pl. xi, fig. 5.

Silpha ænescens, California; Casey, Bull. Cal. Ac. Sci. ii, p. 171, n. sp.

Isereus, n. g. for *Trocharanis æambeui*, Arg.; Reitt., Wien. ent. Z. v, p. 100.

Atumbra, n. g. for *Catopsimorphus josephineæ*, Sauley; Goz., Recherche, p. 17.

Attiscurra, n. g. for *C. marqueti*, Fairm.; Goz., Recherche, p. 17.

Ptomaphagus saburratus, France; Goz., Recherche, p. 17, n. sp.

Catopsolius, n. g. near *Catops*, p. 383, for *C. levicollis*, New Zealand, n. sp., p. 384, pl. xii, fig. 16; Sharp, Tr. R. Dublin Soc. (2) iii.

Microsilpha, n. g. (affinities not alluded to), p. 889, for *M. litorea*, n. sp., New Zealand, p. 890; Broun, Man. N. Z. Col.

Choleva granifer, p. 890, *fulvitaris*, p. 946, New Zealand, Broun, Man. N. Z. Col.: n. spp.

Mesocolon clathrata, *liturata*, and *puncticeps*, Broun, belong to *Choleva*; Broun, Man. N. Z. Col. p. 891.

Mesocolon varius, New Zealand; Broun, Man. N. Z. Col. p. 946, n. sp.

Agathidium, Ill., = (*Cyphoclebe*, Th.); Goz., Recherche, p. 16.

Neoceble, p. 16, *Saccoceble*, p. 17, n. subgg. of *Agathidium*; Goz., Recherche, p. 16.

Agathidium capsicum, Lyrik; Reitt., Radde Faun. Casp. p. 208, n. sp.

Deltoenemis, n. g. near *Triarthron*, for *D. hamatus*, Siberia, n. sp.; Sahl., Wien. ent. Z. v, p. 87.

Astagobius, n. g. for part of *Leptoderus*; Reitt., Wien. ent. Z. v, p. 315.

Brathinus oculatus, Japan; Lew., Ent. M. M. xxiii, p. 85, n. sp.

Bisaya, n. g. (*Clambides*), p. 209, very aberrant, for *B. nössidiiformis*, Lenkoran, n. sp., p. 211, pl. i, fig. 4; Reitt., Radde Faun. Casp.

TRICHOPTERYGIDÆ.

[Cf. Casey (118), Flach (197).]

Anisarthritis, Steph., = (*Ptenidium*, Er.); Goz., Recherche, p. 16.

Ptilium ædipus, "Gall. m."; Flach, Deutsche e. Z. xxx, p. 248, n. sp.

Ptilium sulcatum, Texas; Casey, Bull. Cal. Ac. Sci. ii, p. 248, pl. vii, fig. 16, n. sp.

Smicrus americanus, Texas; Casey, Bul. Cal. Ac. Sci. ii, p. 250, pl. vii, fig. 17, n. sp.

Actidium rotundicolle, Texas; Casey, Bull. Cal. Ac. Sci. ii, p. 248, pl. vii, fig. 15, n. sp.

SCAPHIDIIDÆ.

[Cf. Broun (86), Fairmaire (176), Reitter (597).]

Scaphidium quadriguttatum, sexual distinctions; Schwarz, Ent. Am. ii, p. 138.

Scaphidium yunnanum, Yunnan; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 318, n. sp.

Bæocera nobilis, Sardinia, Reitt., Bull. Soc. Ent. Ital. xxviii, p. 32;

B. fulvicolle, *armata*, New Zealand, Broun, Man. N. Z. Col. p. 891: n. spp.

HISTERIDÆ.

[Cf. Broun (86), Heyden (286), Marseul (421), Reitter (573, 595).]

Translation into French of Schmidt's tables for determining the Gallo-rhenane species of; Rev. d'Ent. v, pp. 152-213.

Hololepta sternincisa, Niam-Niam; Marseul, Notes Leyd. Mus. viii, p. 149, n. sp.

Platysoma heydeni, n. sp., p. 245 (but it is *parallelum*, Say, p. 448), Flach., Deutsche e. Z. xxx.

Hister succicola and *cadaverinus* differentiated; Th., Bull. Soc. Ent. Fr. (6) vi, p. x.

Hister robusticeps, Niam-Niam, p. 150, *leseleuci*, p. 151, *humpatanus*, p. 152, W. Africa, Mars., Notes Leyd. Mus. viii, p. 152; *H. crenicollis*, p. 245 (but p. 448 is *H. abbreviatus*, Fab.), Flach., Deutsche e. Z. xxx: n. spp.

Pachycrærus ritsemæ, Liberia, Mars., Notes Leyd. Mus. viii, p. 150, n. sp.

Carosternus and *Idolia* discussed; Lewis, Ent. M. M. xxiii, pp. 63 & 64.
Idolia gibba, n. n. for *I. levigata*, Lew.; Lew., Ent. M. M. xxiii, p. 64.
Saprinus crassipes, *rugifrons*, and allies, specific characters of, discussed; Fauv., Rev. d'Ent. v, p. 177. *S. fuscio-latus*, Gebl., = (*flexuoso-fusciatus*, Motsch.); Lew., Wien. ent. Z. v, p. 280. *S. venustus*, Er., referred to *Phoxonotus*; Lew., t. c. p. 280. *S. punctulipennis*, Broun, belongs to *Epierus*; Broun, Man. N. Z. Col. p. 892.

Saprinus turkestanicus, Turkestan, Schmidt, Deutsche e. Z. xxx, p. 185; *S. sardous*, p. 246 (but p. 448 is the same as *assimilis*, Payk.), Flach., Deutsche e. Z. xxx, n. spp.

Gnathonus rotundatus, Kug., = (*Triballus 4-striatus*, Woll.); Lew., Wien. ent. Z. v, p. 280.

Epierus abrogatus, *planiceps*, *crenulatus*, p. 892, *simplex*, *rusticus*, p. 893, New Zealand, Broun, Man. N. Z. Col. : n. spp.

Dendrophilus championi, Besika Bay, = (*sulcatus*, Lew., nec Motsch.), Lew., Wien. ent. Z. v, p. 280, n. sp.

Onthophilus costipennis, Mars., = (*bipartitus*, Lew.); Lewis, Wien. ent. Z. v, p. 280.

Heterius ferrugineus, Ol., habits; Wasman, Deutsche e. Z. xxx, pp. 59-61.

Heterius grandis, Talysch, Reitt., Radde Faun. Casp. p. 212, pl. i, fig. 5, n. sp.

Eretmodes talyschensis, Talysch, Reitt., Radde Faun. Casp. p. 213, n. sp.

Abraeus areolatus, p. 213, *minutissimus*, *punctulus*, p. 214, Caspian region, Reitt., Radde Faun. Casp., n. spp.

Abraeomorphus, n. g., near *Bacanius*, for *A. minutissimus* and *punctulus*, Reitt.; Reitt., Wien. ent. Z. v, p. 272.

Abraeodes, n. g., near preceding, for *A. raddei*, Reitt.; Reitt., Wien. ent. Z. v.

Acritus clarulus, Lenkoran, Reitt., Radde Faun. Casp. p. 215, n. sp.

NITIDULIDÆ.

[Cf. Kolbe (360), Sharp (655).]

Brachypterus, Kug., = (*Cercus*, auct.); Goz, Recherche, p. 11.

Pulion, n. subg. of *Brachypterus*, Kug.; Goz., Recherche, p. 12.

Brachyleptus, Motsch., to be used for *Brachypterus*, auct.; Goz., Recherche, p. 11.

Virbius, n. subg. of *Brachyleptus*, Motsch.; Goz., Recherche, p. 11.

Soronia oculata, Reitter, noticed; Sharp, Tr. R. Dublin Soc. (2) iii, p. 451.

Ips parvipustulata, Korea, Kolbe, Arch. f. Nat. lii (1), p. 180, pl. xi, fig. 24; *I. minimus*, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 391 : n. spp.

Lyctus, F., = (*Rhizophagus*, auct.); Goz, Recherche, p. 11.

TROGOSITIDÆ.

[Cf. Broun (86), Fairmaire (175), Olliff (501).]

Zimioma, n. n. for *Peltis*, Kug., auct.; Goz., Recherche, p. 11.

Peltis colobicoides, Fairm., figured; Ann. Soc. Ent. Fr. (6) vi, pl. ii, fig. 2.

Pachycephala chlorotica, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 31, n. sp.

Holocephala, n. n. for *Pachycephala*, Fairm. (præocc.); Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 32.

Neaspis (sub *Soronia*) *variegata*, Macl., = (*subtrifasciata*, Reitt.); Oll., P. Linn. Soc. N.S.W. x, p. 709.

Ancyrona laticeps, p. 710, *ægra*, p. 711, *lutebrosa*, p. 712, *amica*, *vesca*, p. 713, Australia, Oll., P. Linn. Soc. N.S.W. x, n. spp.

Leperina seposita, p. 702, *conspicua*, p. 704 (Lizard island), *fraterna*, p. 707, Australia, Oll., P. Linn. Soc. N.S.W. x, n. spp.

Leperina decorata, Er., = (*gayndahensis*, Macl.); Oll., P. Linn. Soc. N.S.W. x, p. 702.

Grynomia viridescens, New Zealand, Broun, Man. N. Z. Col. p. 893, n. sp.

COLYDIIDÆ.

[Cf. Broun (86), Marseul (420), Sharp (655).]

Rechodes coquereli, Fairm., figured; Ann. Soc. Ent. Fr. (6) vi, pl. ii, fig. 1.

Lastrema and *Niphopelta*, full characters given; Reitt., Radde Faun. Casp. pp. 216 & 217.

Heterargus, n. g., near *Coxelus*, for *H. rudis*, N. Zealand, n. sp., pl. xii, fig. 17, Sharp, Tr. R. Dublin Soc. (2) iii, p. 384.

Coxelus grossanus, p. 927, *chalmeri*, p. 949, New Zealand, Broun, Man. N. Z. Col., n. spp.

Ablabus, Broun, probably to be merged in *Ulonotus*; Broun, Man. N. Z. Col. p. 895.

Ablabus nodosus, New Zealand, Broun, Man. N. Z. Col. p. 894, n. sp.

Notoulus (presumably new generic name, and possibly from the specific reference identical with *Ablabus*) *sparsus*, *libentus*, New Zealand, Broun, Man. N. Z. Col. p. 947 : n. spp.

Ulonotus punctatus, p. 894, *isostictus*, p. 926, *carus*, p. 947, *fuscatus*, *rufescens*, *cinereus*, p. 948, *integratus*, p. 949, New Zealand, Broun, Man. N. Z. Col.; *U. dissimilis*, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 387, pl. xii, fig. 18 : n. spp.

Epistronus parvus, New Zealand, Broun, Man. N. Z. Col. p. 950, n. sp.

Lithostygnus, n. g., near *Langelandia*, for *S. costalis* (sic), New Zealand, n. sp., Broun, Man. N. Z. Col. p. 950.

Bitoma scita, *guttata*, New Zealand, Broun, Man. N. Z. Col. p. 895; *B. sellata*, pl. xii, fig. 20, *auriculata*, p. 385, *serraticula*, *mundula*, p. 386, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii : n. spp.

Enarsus cucullatus, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, pl. xii, fig. 19, n. sp.

Colydium, F., = (*Aulonium*, auct.); Goz., Recherche, p. 11.

Paschabium, n. n. for *Colydium*, auct.; Goz., Recherche, p. 11.

Pycnomerus, specific characters of the New Zealand species of, noticed; Sharp, Tr. R. Dublin Soc. (2) iii, p. 388.

Pycnomerus carinellus, cæcus, p. 896, *hirtus*, *lateralis*, p. 897, *arboreus*, p. 927, *cognatus*, p. 951, New Zealand, Broun, Man. N. Z. Col.; *P. longulus*, pl. xii, fig. 21, *helmsi*, *sulcatissimus*, pl. xii, fig. 22, p. 389, *latitans*, p. 390, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii: n. spp.

Pycnomerodes, n. g. allied to *Pycnomerus*, for *P. peregrinus*, sp. n., New Zealand, p. 952; Broun, Man. N. Z. Col.

Bothrideres cognatus, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 390, n. sp.

Cerylon, the European species tabulated, discussed, and described; Fowler, Ent. M. M. xxiii, pp. 71-76. *Cerylon*, Latr., = (*Pycnomerus*, Er. auct.); Goz., Recherche, p. 11.

Aphardion, n. n. for *Cerylon*, Er., auct.: Goz., Recherche, p. 11.

CUCUJIDÆ.

[Cf. Fairmaire (174), Marseul (420), Sharp (655).]

Hectarthrum longicolle, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 441, n. sp.

Cheilopoma castaneum, Murray; Qued., B. E. Z. xxx, pp. 73 & 74, woodcut, corrects some errors in Murray's description.

Porphyryus, n. n. for *Cucujus*, auct. (nec Geof.); Goz., Recherche, p. 20.

Psammæcus; *Lathridium serrulatum*, Montr., referred to this; Belon, Ann. Ent. Belg. xxx, p. 89.

Brontopriscus, n. g. near *Brontes*, p. 391, to include *B. pleuralis*, Shp., and *B. sinuatus*, n. sp., New Zealand, p. 392, pl. xii, fig. 23; Sharp, Tr. R. Dublin Soc. (2) iii.

Cathartocryptus, n. g. near *Cathartus*, p. 392, for *C. obscurus*, New Zealand, sp. n., pl. xii, fig. 24, p. 393; Sharp, Tr. R. Dublin Soc. (2) iii.

Saphophagus, n. g., allies doubtful, p. 393, for *S. minutus*, New Zealand, n. sp., pl. xii, fig. 25, p. 394; Sharp, Tr. R. Dublin Soc. (2) iii.

Picrotus, n. g., allies unknown, family doubtful, pp. 394 & 452, for *P. thoracicus*, New Zealand, n. sp., pl. xii, fig. 9, p. 395; Sharp, Tr. R. Dublin Soc. (2) iii.

CRYPTOPHAGIDÆ.

[Cf. Marseul (420), Reitter (573).]

Atomaria, Steph., = (*Anchicera*, Th.); Goz., Recherche, p. 10.

Agathengis, n. n. for *Atomaria*, Thoms.; Goz., Recherche, p. 10.

Atomaria castanoptera, Lenkoran, Reitt., Radde Faun. Casp. p. 219, n. sp.

Loberus; *Lathridium obscurum*, Mont., referred to this; Belon, Ann. Ent. Belg. xxx, p. 89.

Telmatophilus americanus, ♂ characters; Schwarz, Ent. Am. ii, p. 138.

LATHRIDIIDÆ.

[Cf. Belon (45, 46), Broun (86), Reitter (573).]

Langelandia, Aubé, to be placed in *Colydiidæ*; Belon, Ann. Soc. L. Lyon, xxx, p. 433. *L. reitteri*, name proposed for *L. exigua*, Reitt., nec Perris; *id. t. c.* p. 436.

Parascheva, n. n. for *Corticaria*, auct.; Goz., Recherche, p. 10 [cf. Belon, Ann. Ent. Belg. xxx, p. 93, who rejects the name].

Lathridium obscurum, Montr., cf. *Loberus Cryptophagide*: *L. serrulatum*, Montr., cf. *Psammæchus Cucujidæ*.

Latridius priopterus, puncticeps, New Zealand, Broun, Man. N. Z. Col. p. 898, n. spp.

Metopthalmus humeridens, Caspian region, Reitt., Radde Faun. Casp. p. 219, n. sp.

Corticaria pacata, erythrocephala, platyptera, p. 899, *semirufa*, p. 952, *gilvipes*, p. 953, New Zealand, Broun, Man. N. Z. Col., n. spp.

Monotoma scabra, Kunze, is distinct from *picipes*, Hbst., Deutsche e. Z. xxx, p. 91.

MYCETOPHAGIDÆ.

[Cf. Marseul (420), Reitter (573), Sharp (655).]

Tritoma ancora, p. 220, pl. i, fig. 7, *insulata*, p. 221, fig. 8, Caspian region, Reitt., Radde Faun. Casp., n. spp.

Triphyllus huttoni, zealandicus, pl. xiii, fig. 1, *maculosus*, p. 396, *conferatus, concolor, rubicundus*, p. 397, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, n. spp.

Brycolacion, n. n. for *Typhæa*, auct.; Goz., Recherche, p. 10.

Typhæa, Steph., = (*Telmatophilus* auct.); Goz., Recherche, p. 10.

DERMESTIDÆ.

[Cf. Broun (86), Fairmaire (176), Jacquet (328), Reitter (573).]

Dermestes vorax, Motsch., described as valid species; Kolbe, Arch. f. Nat. lii, 1, p. 183. *D. vulpinus*, Fab., its injuries to boots and shoes; Riley, Rep. 1885, pp. 258-264, pl. vi, fig. 2 (metamorphoses).

Montandonia, n. g. for *M. catopoides*, n. sp., Hungary; Jacq., Ann. Soc. L. Lyon, xxxii, p. 319.

Asprogramme, n. n. for *Megatoma* auct.; Goz., Recherche, p. 10.

Hadrotoma antoniæ, Caspian region, Reitt., Radde Faun. Casp. p. 222, n. sp.

Trogoderma granulata, p. 900, *punctata, suffusa*, p. 953, New Zealand, Broun, Man. N. Z. Col., n. spp.

Trinodes sinensis, Kiang-si, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 319, n. sp.

Axinocerus americanus, sexual distinctions; Schwarz, Ent. Am. ii, p. 138.

BYRRHIDÆ.

[Cf. Broun (86), Casey (118), Fairmaire (176), Reitter (586, 587).]

Morychus villosus, p. 900, *mixtus*, p. 901, New Zealand, Broun, Man. N. Z. Col., n. spp.

Dendrodipnis hageni, ritsemæ, punctulatus, p. 217, *marginatus*, p. 218, Sumatra, Reitt., Notes Leyd. Mus. viii, p. 218, n. spp.

Simpliocaria hispidula, Kiang-si, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 319, n. sp.

Dilaphrus, n. g., near *Bothriophorus*, p. 250, for *D. scymnoides*, Texas, n. sp., p. 252; Casey, Bull. Cal. Ac. Sci. ii.

Chelonarium unifasciatum, p. 219, *fascicolle*, p. 220, *irroratum*, p. 221, Sumatra, Reitt.; Notes Leyd. Mus. viii, n. spp.

PARNIDÆ.

[*Cf.* Broun (86), Reitter (585), Sharp (655).]

Parnus (*Dryops*): tabulation of the European species, with some synonymy; Reitt., Wien. ent. Z. v, pp. 350 & 351. *Dryops ernesti*, n. n. for *D. auriculatus*, Panz., nec Ol.; Goz., Recherche, p. 9.

Protoparnus longulus, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 383, n. sp.

Hydora nitida, p. 927, *obsoleta*, p. 928, New Zealand, Broun, Man. N. Z. Col., n. sp.

Stenelmis bicolor, pictus, Sumatra, Reitt., Notes Leyd. Mus. viii, p. 213, n. spp.

Ancyronyx constrictus, Sumatra, Reitt., Notes Leyd. Mus. viii, p. 214, n. sp.

Elmis glaber, Horn, var., = (*vulneratus*, Lec.); Horn, P. Am. Ent. Soc. xiii, p. xiii.

Oulimnius, n. n. for *Limnius*, Er.; Goz., Recherche, p. 9.

HETEROCERIDÆ.

[*Cf.* Reitter (573).]

Heterocerus vitticollis, Lenkoran, Reitt., Radde, Faun. Casp. p. 223, pl. i, fig. 8, n. sp.

LUCANIDÆ.

[*Cf.* Albers (3), Aurivillius (15), Bates (247), Broun (86), Ganglbauer (229, 230), Poll (535), Sharp (655), Waterhouse (726).]

Cantharolethrus luxerii, Buq., sexes figured; Bates, Biol. Centr. Am. Col. ii (2), pl. i, figs. 1 & 2.

Chiasognathus gaujoni, Ecuador, R. Oberth., Bull. Soc. Ent. Fr. (6) v, p. cxviii, n. sp.

Lucanus cervus, L., monstrosity; Friv., Term. fizetek. x, p. 79, and Bull. Soc. Ent. Fr. (6) vi, p. clxxix: mode of fighting, copulation, &c.; White, P. E. Soc. 1886, pp. xxxviii-xl.

Eurytrachelus consentaneus, Pekin, Albers, Deutsche e. Z. xxx, p. 28; *E. alcides*, Voll., and *eurycephalus*, Burm., discussed, with *E. vollenhovi*, n. sp., = (*eurycephalus*, Voll., Tijdschr. Ent. viii, pl. x, fig. 4), *id. t. c.* p. 83: n. spp.

Odontolabis inæqualis, Kaup., ♀ described; Albers, Deutsche e. Z. xxx, p. 28. *O. celebensis*, Leuth., ♀ described; *id. t. c.* p. 243.

Dorcus caucasicus, Caucasus, Gangl. Soc. Ent. i, p. 81, n. sp.

Ægognathus leuthneri, Columbia, Poll., Tijdschr. Ent. xxix, p. 153, n. sp.

Sclerostomus buckleyi, Ecuador, Wat., Anñ. N. H. (5) xvii, p. 498, n. sp.

Lissotes rufipes, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 398, n. sp.

Ceratognathus gibbosus, p. 928 (probably a *Mitophyllus*, id.), New Zealand, Broun, Man. N. Z. Col., n. sp.

Platycerus agassii, Lec., = (*californicus*, Casey); Horn, P. Am. Ent. Soc. xiii, p. xiii. *P. californicus*, Casey, maintained as distinct; Casey, Bull. Cal. Ac. Sci. ii, p. 263.

Æsalus neotropicalis, Guatemala, Bates, Biol. Centr. Am. Col. ii. (2), pl. i, figs. 3, 3a, p. 2, n. sp.

PASSALIDÆ.

[Cf. *Aurivillius* (15), Bates (247).]

Bates, Biol. Centr. Am. Col. ii (2) pp. 2 & 3, discusses with disapprobation Kaup's classification of the family.

Proculejus pubicostis, Mexico, pl. i, fig. 4, *championi*, Guatemala, pl. i, fig. 5, Bates, Biol. Centr. Am. Col. ii (2), p. 5, n. spp.

Oileus heros, figured; Bates, Biol. Centr. Am. Col. ii (2), pl. i, fig. 6.

Oxyges lavissimus, figured, pl. i, fig. 7; Bates, Biol. Centr. Am. Col. ii (2).

Proscelitus, n. gen., near *Proculejus*, for *P. obesus*, Mexico, n. sp.; Bates, Biol. Centr. Am. Col. ii (2), p. 7.

Trienurgus, n. gen. for *T. subopacus*, Guatemala, n. sp., pl. i, fig. 8, p. 8; Bates, Biol. Centr. Am. Col. ii (2).

Pseudacanthus laticornis, Truq., figured, pl. i, fig. 9; *P. (?) jalapensis*, Mexico, pl. i, fig. 10, n. sp.; Bates, Biol. Centr. Am. Col. ii (2).

Platyverres, n. gen. for *Verres intermedius*, Kaup., p. 9; the species figured, pl. i, figs. 11 & 12; Bates, Biol. Centr. Am. Col. ii (2).

Truquius, n. gen. for *Passalus astecus*, Truq.; Bates, Biol. Centr. Am. Col. ii (2), p. 10.

Popilius mysticus, p. 11, *granulifrons*, pl. i, fig. 13, *debilis*, pl. i, fig. 14, p. 12, *purulensis*, p. 13, Guatemala, Bates, Biol. Centr. Am. Col. ii (2), n. spp.

Vindex sculptilis, Guatemala, Bates, Biol. Centr. Am. Col. ii (2), p. 13, n. sp.

Neleus tlascala, Perch, figured, pl. i, figs. 15 & 15a, and considered as probably distinct from *N. punctiger*, p. 14, Bates, Biol. Centr. Am. Col. ii (2).

Rhodocanthopus spiniger, Guatemala to Panama, pl. i, figs. 16 & 16a, p. 15, *curtus*, Guatemala, p. 17, Bates, Biol. Centr. Am. Col. ii (2), n. spp.

Phoroneus jansonii, Nicaragua, pl. i, figs. 17 & 17a, p. 18, Bates, Biol. Centr. Am. Col. ii (2), n. sp.

Soranus championi, Guatemala, pl. i, figs. 18 & 18a, p. 20, *yucatanus*, Mexico; *S. (?) intergeneus*, Mexico, Guatemala, p. 21, Bates, Biol. Centr. Am. Col. ii (2): n. spp.

Veturius cirratus, Panama, pl. i, figs. 19, 19a, p. 23, Bates, Biol. Centr. Am. Col. ii (2), n. sp.

Verres cavicollis, Mexico, pl. i, figs. 20 & 20a, p. 24, Bates, Biol. Centr. Am. Col. ii (2), n. sp.

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SCARABÆIDÆ.

[*Cf.* Behr (41), Borre (67, 68, 69, 70, 71, 72), Brenske (78), Broun (86), Casey (117), Dugès (156), Fairmaire (174, 175, 176), Harold (277), Heyden (287, 289), Kolbe (360), Kraatz (573), Lansberge (388, 390, 391), Macleay (411, 412, 413), Raffray (577), Reitter (573), Sallé (629), Sharp (655), Waterhouse (726); also *Cetoniides*, p. 140.]

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Scarabæus sacer, L.: early Greek nomenclature; Ball, (23) pp. 333 & 334. *Ateuchus sacer*, motor nerves; Gabbi, Bull. Soc. Ent. Ital. p. 322, pl. xi, fig. 7. *A. sacer*, L., n. var., *peregrinus*, Korea; Kolbe, Arch. f. Nat. lii, 1, p. 184, pl. xi, fig. 26.

Scarabæus velhi, Benguela, p. 69, *vanderkelleni*, Humpata, p. 70, Lansb., Notes Leyd. Mus. viii, n. spp.

Sisyphus impressipennis, Humpata, Lansb., Notes Leyd. Mus. viii, p. 73; *S. denticrus*, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 320: n. spp.

Gymnopleurus (sub *Scarabæus*) *pilularius*, L., = (*geoffroyi*, auct.); Goz., Recherche, p. 19.

Gymnopleurus morosus, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 319; *G. modestus*, Benguela, *vanderkelleni*, W. Africa, Lansb., Notes Leyd. Mus. viii, p. 72: n. spp.

Saphobius squamulosus, New Zealand, Broun, Man. N. Z. Col. p. 954; *S. setosus*, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 398: n. spp.

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Aulonocnemis, Kl., commented on; *A. opatrina*, Kl., *anobioides* and *irregularis*, Har., described: Fairm., Ann. Soc. Ent. Fr. (6) vi, pp. 32 & 33.

Aulonocnemis crassecostata, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 32, pl. ii, fig. 3, n. sp.

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Diastellopalpus, n. gen. for some *Onthophagi*, viz., *lamellicollis*, Qued., *johnstoni*, Wat., *tridens*, Ol., and *noctis*, Th.; Lansb., Notes Leyd. Mus. viii, p. 91.

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Oxyomus inaequalis, Humpata, Lansb., Notes Leyd. Mus. viii, p. 92, n. sp.

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Phæochrous davidis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 323, n. sp.

Hapalonychus: genus recharacterized, synonymy of *H. waterhousei*; Borre, Ann. Ent. Belg. xxx, pp. 121 & 122.

Chetodus striatus, Monte Video, *amazonicus*, Amazons, Borre, Ann. Ent. Belg. xxx, n. spp.

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Enoplotrupes and *Gynoplotrupes* discussed and united; Fairm., Ann. Soc. Ent. Fr. (6) vi, pp. 320 & 321.

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Bradycinetus hornii, California, Rivers, Bull. Cal. Ac. Sci. ii, p. 61, n. sp.

Athyreus flavohirtus, Walk., redescribed from Obock; Fairm., Ann. Soc. Ent. Fr. (6) v, p. 443.

Pleocomides.

Plecoma fimbriata, habits; Rickseker, Ent. Am. ii, pp. 201 & 202.

Trogides.

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Megalotrox, n. subg. of *Trox*, for *T. gigas*, Har., and *Dohrni*, Har.; Borre, Ann. Ent. Belg. xxx, p. 59.

Trox funestus, Humpata, Lansb., Notes Leyd. Mus. viii, p. 94, n. sp.

Liparochnus alternans, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 146, n. sp.

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Dichelus (*Platychelus*) *æquatorialis*, Humpata, Lansb., Notes Leyd. Mus. viii, p. 94, n. sp.

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Triodonta procera, Congo, Lansb., Notes Leyd. Mus. viii, p. 95, n. sp.

Serica verticalis, Humpata, Lansb., Notes Leyd. Mus. viii, p. 96 ; *S. nucea*, *semicribrosa*, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 36 : n. spp.

Holoschiza, n. g., between *Serica* and *Trochalus*, for *H. dentilabris*, W. Africa, n. sp., Lansb., Notes Leyd. Mus. viii, p. 97.

Trochalus maculifrons, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 35, n. sp.

Ablabera iridescens, *æneobrunnea*, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 37, n. spp.

Hypotrichia spissipes, habits noticed ; P. E. S. Wash. i, p. 13.

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Pyronota leta, Fabr., var. = (*P. munda*, Sharp) ; Shp., Tr. R. Dublin Soc. (2) iii, p. 399.

Pyronota lugubris, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 398, n. sp.

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Scythrodes, n. g., near *Odontria*, for *S. squalidus*, New Zealand, n. sp., Broun, Man. N. Z. Col. p. 955.

Ancistrosoma monographed by Sallé, with figs. of *A. rufipes*, Latr., *fluvovittatum*, Blch., *vittigerum*, Er.; Ann. Soc. Ent. Fr. (6) vi, pp. 465-468, pl. viii.

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Apogonia nigro-olivacea, Pekin, Heyd., Deutsche e. Z. xxx, p. 292; *A. cupreoviridis*, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 193: n. spp.

Schizonycha biangulata, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 445; *S. pexicollis*, Yunnan, *id. op. cit.* vi, p. 325: n. spp.

Leucopholis rorida, monstrosity of antenna; C.R. ent. Belg. 1886, p. cxliii, woodcut.

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Haplidia, note on the European species, concluding that their number must be much reduced; de Borre, C.R. ent. Belg. 1886, pp. cxxxviii-cxli.

Rhizotrogus porosus noticed, p. 199; *R. vulpinus*, *pilicollis*, and *tauricus*, synonymy discussed; *R. burmeisteri*, n. n. for *Amph. pilicollis*, Burm.; *parvulus*, Ros., = (*hidalgoi*, Perez); *R. laticollis* and *parvicollis*, Perez, are one species, pp. 206 & 207: Brenske, Deutsche e. Z. xxx.

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Hylotrogus, n. g. near *Rhizotrogus*, p. 325, for *H. unguicularis*, *iridipennis*, *stolidus*, Yunnan, n. spp., Fairm., Ann. Soc. Ent. Fr. (6) vi.

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Thyce marginata, California, Casey, Bull. Cal. Ac. Sci. ii, p. 39, n. sp.

Hoplosternus incanus, Motsch., ? = (*M. mandarina*, Fairm.), noticed; Heyd., Deutsche e. Z. xxx, p. 284.

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Tanyproctus and *Brachydema* are probably identical ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 325.

Tanyproctus davidis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 324, n. sp.

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Rhinhyptia rostrata, Burm., = (*bilaminifrons*, Ancey) ; Fairm., Ann. Soc. Ent. Fr. (6) v, p. 444.

Rhinhyptia dollei, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 444, n. sp.

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Euchlora cuprea, Hope, n. var., *viridana*, Korea ; Kolbe, Arch. f. Nat. lii, 1, p. 192.

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Mimela davidis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 330, n. sp.

Spilota plagiocollis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 329, n. sp.

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Adoretus costipennis, Congo, Lansb., Notes Leyd. Mus. viii, p. 104, n. sp.

Dynastides.

Ligyrrus rugiceps, Lec., injurious to corn ; Riley, Bull. Dep. Agric. Ent. xii, p. 32, pl. 1, fig. 1.

Heteronychnus costatus, Humpata, Lansb., Notes Leyd. Mus. viii, p. 105, n. sp.

Scarabæus, L., = (*Oryctes*, auct.) ; Goz., Recherche, p. 19.

Oryctes nasicornis, motor-nerves in larva ; Bull. Soc. Ent. Ital. xviii, p. 323, pl. xi, fig. 6.

Phyllognathus ? paulseni, Concepcion, *simplicifrons*, Peru, Fairm., Bull. Soc. Ent. Fr. (6) v, p. clxxxix, n. spp.

Astaborus thomsoni, p. 320, *tridens*, p. 321, *deplanatus*, *rudis*, p. 322, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v, n. spp.

Temnorhynchus tridentatus, W. Africa, Lansb., Notes Leyd. Mus. viii, p. 106, n. sp.

Strategus julianus, Burm., metamorphoses ; Dag., Ann. Ent. Belg. xxx, p. 27, pl. i, figs. 1-14.

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Megasoma elephas, note on, with wood-engraving ; Girard, Le Nat. 1886 (1) pp. 55-58.

Dynastes tityus, L., production of sound by ; Hamilton, Canad. Ent. xviii, p. 112.

Cetoniides.

[*Cf.* Ancey (6), Aurivillius (15), Kolbe (360), Kraatz (376, 377), Lansberge (390), Macleay (411), Poll (536, 537, 538, 539, 540), Raffray (577), Sharp (658).]

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Goliathus higginsii and *russus* noticed : Ent. Nachr. xii, p. 314.

Compscephalus horsfieldianus, variation described ; Raff., Ann. Soc. Ent. Fr. (6) v, p. 323.

Megalorrhina harrisii var. *eximia*, n. var. ; Auriv., Bih. Sv. Ak. Handl. xii, 4, 1, p. 5.

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Eudicella chloe, Abyssinia, Raff., Ann. Soc. Ent. Fr. (6) v, p. 325, n. sp.

Caelorrhina affinis, Camaroons, Auriv., Bih. Sv. Ak. Handl. xii, 4, 1, p. 6, n. sp.

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Dyspilophora distincta, Congo, Poll., Tijdschr. Ent. xxix, p. 155, n. sp.

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Endodonta, n. g., *Ischnostomides*, for *E. vanderkelleni*, Humpata, n. sp., Lansb., Notes Leyd. Mus. viii, p. 108.

Amithao albopictus, Panama, Poll, Notes Leyd. Mus. viii, p. 233, n. sp.

Gymnetis kerremansi, Panama, Poll, Notes Leyd. Mus. viii, p. 231, n. sp.

Guatemulica, n. g. for *Allorrhina hueti*, Chev. ; Poll, Notes Leyd. Mus. viii, p. 138.

Moscheuma levicostatum, Panama, p. 234, *sebosum*, Guyana ?, p. 236, Poll., Notes Leyd. Mus. viii, n. spp.

Lomaptera and allied genera, composition of ; Poll (538). *L. xanthopus*, Boisd. : Kraatz, Deutsche e. Z. xxx, pp. 433-437, discusses this and its allies, concluding that *distincta*, Lansb., *Lansbergei*, Kr., and *dichropus*, Lansb., are varieties of it ; and that *validipes*, Th., ♀, = (*levipennis*, Poll).

Lomaptera mucterophalloides, Salwatty, Poll, Notes Leyd. Mus. viii, p. 185, n. sp.

Mucterophallus, n. g. for part of *Lomaptera*, Poll, Tijdschr. Ent. xxix, p. 151. *Mycterophallus*, Poll, not distinct from *Ischiopsopha*; Kr., Ent. Nachr. xii, p. 310. *Mycterophallus* considered to be a group of *Lomaptera*; Kr., Deutsche e. Z. xxx, pp. 301-304.

Mucterophallus lævipennis, Aru Islands, Poll, Notes Leyd. Mus. viii, p. 187, n. sp.

Ischiopsopha ritsemæ, Soela Besi I. (near Celebes), p. 182, *gestroi*, New Guinea?, p. 18, Poll, Notes Leyd. Mus. viii, n. spp.

Thaumastopeus shanghaiicus, China, Poll, Notes Leyd. Mus. viii, p. 181, n. sp.

Macronota halyi, Ceylon, Sharp, Ent. M. M. xxii, p. 197, n. sp.

Gnathocera valida, Jans, and *costata*, Ancey, distinguished; Poll, Notes Leyd. Mus. viii, p. 126. *G. hirta*, Burm., var. *hyacinthina*, *afzelii* n. varr. *benuensis*, *latevittata*, *varians*, Gory, *trivittata* n. varr. *confluens*, *egyptiaca*, discussed, pp. 437-442.

Gnathocera bilineata, Benue, p. 439, Kraatz, Deutsche e. Z. xxx, n. sp.

Clithria: note on the genus; *C. eucnemis*, Burm., ♀ described; *C. bicostata*, Kr., and *albersi*, Kr., noticed; Poll, Deutsche e. Z. xxx, pp. 297 & 298. *C. eucnemis*, n. var. *nigripes*; Kr., t. c. p. 300.

Neoclithria, n. g. for *Lenosoma incana*, Macl., p. 298; Poll, Deutsche e. Z. xxx.

Pseudoclithria, n. g. for *Schizorhina hirticeps*, Macl., of which *nigrans*, Macl., is a variety; Poll, Deutsche e. Z. xxx.

Euryomia rufitincta, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 147, n. sp.

Glyciphana velutina, Macl., P. Linn. Soc. N.S.W. (2) i, p. 148, n. sp.

Oxythyrea haroldi, Lansb., noticed; Kraatz, Deutsche e. Z. xxx, p. 20.

Microthyrea, Kr., = (*Mausoleopsis*, Lansb.), *M. thoracica*, Schm., = (*Leucocelis ruficauda*, Lansb.), *M. heterospila*, Gerst., and *picticollis*, Kr., noticed; Kraatz, Deutsche e. Z. xxx, p. 20.

Leucocelis amethystina and *hæmorrhoidalis* discussed; Lansb., Notes Leyd. Mus. viii, p. 112.

Leucocelis haroldi = (*dysentericus*, Har., nec Boh.), W. Africa, Lansb., Notes Leyd. Mus. viii, p. 111, n. sp.

Cetonia aurata, &c., mode of destruction of by *Scolia*; Fabre, (173) chaps. i-iv: as prophylactic for hydrophobia; Bull. Mosc. xl, p. 172. *C. mimula*, Har., *nigrocyanea*, Kr., and *crassa*, Har., variations and characters noticed; Heyd., Deutsche e. Z. xxx, p. 286. *C. bogdanoffi*, Solsky, *interruptocostata*, Ball., *conglomerata*, Solsky, *marginicollis*, Ball., *hungarica*, Hbst., with varr. *turkestanica*, *persica*, and *cyanea*, note on; Kraatz, Hor. Ent. Ross. xx, pp. 104-108.

Cetonia seulensis, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 194, pl. xi, fig. 29; *C. soudanica*, Soudan, Ancey, Le Nat. viii, p. 224: n. spp.

Simorrhina, n. g., p. 442, intermediate between *Goliathides* and *Pachnoda*, for *S. staudingeri*, Benue, n. sp., p. 443; Kraatz, Deutsche e. Z. xxx.

Pachnoda vethi, p. 112, *impunctata*, p. 113, W. Africa, Lansb., Notes Leyd. Mus. viii, n. spp.

Eriulus variolosa, var. *læviscutum* noticed; Kr., Deutsche e. Z. xxx, p. 444.

Pseudinca admixta, Hope, var. *knutsoni*, n. var., Auriv., Bih. Sv. Ak. Handl. xii, 4, 1, p. 10.

Charadronota soror, Kr., var. *punctata*, n. var. (an. nov. spec. ?), Camaroons, Auriv., Bih. Sv. Ak. Handl. xii, 4, 1, p. 11.

Incala camarunica, Camaroons, Auriv., Bih. Sv. Ak. Handl. xii, 4, 1, p. 12, n. sp.

Cremastochilus, note on deciduous processes of prothorax, Horn, Ent. Am. i, p. 187.

BUPRESTIDÆ.

[*Cf.* Fairmaire (175, 176), Ganglbauer (225, 226), Heyden (288), Horn (307), Jakowleff (329), Kerremans (346, 347, 348), Lansberge (390), Macleay (411), Olliff (503), Poll (541, 542, 543), Quedenfeldt (569).

Difference in tracheal system of *Buprestidæ* and *Elateridæ* noticed, Künck, Bull. Soc. Ent. Fr. (6) vi, p. cxxxvi.

Sternocera orissa, vars. = (*bertolonii*, Th., *liturata*, White), also n. var. *funeraria*, p. xxxiv. *S. pulchra*, Wat., and *cambieri*, Borre, are also varr. of the same species, p. xxxv : this is also the case with *S. feldspathica*, White, and *wahlbergi*, Boh., *id. loc. cit.* : also other new varietal names proposed ; Kerr., C.R. ent. Belg. 1886. *S. funebris*, n. var. *ænescens*, Mamboia ; Kerr., Notes Leyd. Mus. viii, p. 190.

Sternocera viridimicans, Tanganyika, Kerr., Notes Leyd. Mus. viii, p. 189 ; *S. tricolor*, *variabilis*, Lake Tanganyika, *id.* C.R. ent. Belg. 1886, p. xcvi ; *S. campanæ*, Angola, Luc., Bull. Soc. Ent. Fr. (6) vi, p. clxiii ; *S. elliptica*, Cape Good Hope, Kerr., C.R. ent. Belg. 1886, p. xxxiii : n. spp.

Amblysterna acutipennis, Damaraland, Kerr., C.R. ent. Belg. 1886, p. xxxvi, n. sp.

Julodis, synonymical remarks as to the probable necessity of uniting several presumed species ; Kerr., C.R. ent. Belg. 1886, pp. xxxvi-xxxviii. *J. oertzeni*, n. n. for *J. intricata*, Mars. nec. Redt., Gangl., S. E. Z. xlvii, p. 309. *J. intricata*, Redt. = (*ruginota*, Mars.) ; *id. t. c.* *J. finchi*, woodcuts of ; P. Z. S. 1885, p. 64.

Julodis amaurosoma, p. xxxvi, *dimidiatipes*, p. xxxvii, Cape Good Hope, *lineata* (Kind. M.S.), p. xxxvii, Persia, Kerr., C.R. ent. Belg. 1886, n. spp.

Iridotænia opaca, Congo, Lansb., Notes Leyd. Mus. viii, p. 117, n. sp.

Chalcotenia waterhousei, n. n. for *C. leta*, Wat. (Ann. & Mag. Nat. Hist. (5) xiii, p. 371, nec. *id.* 1881) ; Poll., Notes Leyd. Mus. viii, p. 222. *C. salamandra*, Th., = (*vittata*, Wat.) ; *id. loc. cit.* *C. 4-signata*, Saund., n. var. *ignita*, *id. loc. cit.*

Psiloptera ritsemæ, Humpata, p. 115, *boucardi*, Mamboia, p. 116, Lansb., Notes Leyd. Mus. viii, n. spp.

Nascio simillima, p. 121, *pulchra*, p. 122, Queensland, *quadrinotata*, Tasmania, p. 123, Poll., Notes Leyd. Mus. viii ; *N. chydaea*, p. 861, *munda*, p. 862, *multesima*, p. 863, Australia, Oll., P. Linn. Soc. N.S.W. (2) i : n. spp.

Buprestis, L., = *Ancylocheira*, Esch.), and *Cucujus*, Geof., = (*Chrysobothrys*, Esch.) ; Goz., Recherche, p. 20.

- Astræus*, synopsis of species; Poll., Notes Leyd. Mus. viii, p. 180.
- Astræus aberrans*, p. 176, *elongatus*, p. 177, *pygmæus*, p. 178, Australia, Poll., Notes Leyd. Mus. viii, n. spp.
- Melobasis suturalis*, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 148, n. sp.
- Phanops cyanea*, n. var. *ærea*, Greece; Gangl., S. E. Z. xlvii, p. 309.
- Kisanthobia ariasi*, n. varr. *krüperi*, *emgei*; Gaugl., Deutsche e. Z. xxx, p. 88.
- Paranthaxia*, n. subg. of *Anthaxia*; Goz., Recherche, p. 21.
- Anthaxia cyanella* and *quercata* are sexes of one species; Roberts, Ent. Am. ii, p. 16.
- Anthaxia turki*, Vienna, *starkei*, Persia, Gangl., Deutsche e. Z. xxx, p. 87; *A. reticollis*, Angola, Qued., B. E. Z. xxx, p. 3, pl. i, fig. 1: n. spp.
- Semnopharus*, n. g., near *Conognathus*, p. 239, for *S. apicalis*, Aru Islands, n. sp., p. 240, Poll., Notes Leyd. Mus. viii.
- Diadoxus erythrurus*, ravages of; P. Linn. Soc. N.S.W. x, p. 721.
- Acmeodera fossiceps*, Angola, Qued., B. E. Z. xxx, p. 4, n. sp.
- Sphenoptera*: sexual distinctions, Qued., B. E. Z. xxx, p. 6; *S. derugata*, Redt., p. 82, *beckeri*, Dohrn, p. 102, redescribed, Jak., Hor. Ent. Ross. xx.
- Sphenoptera exasciata*, p. 83, *morio*, Persia, *sordida*, Caucasus, p. 84, *ganglbaueri*, Persia, p. 85, *komarowi*, "Zulfaguare," *tristis*, p. 87, *tibialis*, p. 88, Turkestan, *igniceps*, Mesopotamia, p. 89, *auriceps*, Smyrna, p. 90, *æneiventris*, Mesopotamia, p. 91, *pilipes*, Turkestan, p. 92, *micans*, Persia, p. 93, *manderstjernæ*, *laticeps*, Turkestan, p. 94, *sicula*, Sicily, p. 95, *irregularis*, Turkestan, p. 96, *sobrina*, Amasia, p. 97, *sulciventris*, Turkestan, p. 98, *latesulcata*, Caucasus, p. 99, *eximia*, *pubescens*, p. 100, *tomentosa*, p. 101, Turkestan, Jak., Hor. Ent. Ross. xx; *S. sculpticollis*, Asia Minor, Heyd., Deutsche e. Z. xxx, p. 278; *S. cyanipes*, p. 5. *intermixta*, p. 6, *fossicollis*, *lunigera*, p. 8, Angola, Qued., B. E. Z. xxx: n. spp.
- Actenodes chrysifrons*, p. 16, pl. i, fig. 8, *ebenina*, p. 17, pl. i, fig. 9, *scabriuscula*, p. 18, pl. i, fig. 10, *levior*, p. 19, *tenuecostata*, p. 20, W. Africa, Qued., B. E. Z. xxx, n. spp.
- Chrysobothridæ*, classification discussed; Qued., B. E. Z. xxx, pp. 9-14.
- Chrysobothris edwardsii*, p. 74, *axillaris*, p. 75, *purpureovittata*, p. 76, *speculifer*, p. 83, *viridicyanea*, p. 84, *dolata*, p. 87, *ludificata*, p. 88, *caurina*, p. 92, *blanchardi*, p. 93, *mali*, p. 97, *nixa*, p. 98, *deserta*, p. 100, *lixa*, p. 101, *cyanella*, *humilis*, p. 102, *merkelii*, p. 105, *libonota*, p. 108, *chalcophoroides*, p. 110, *prasina*, p. 118, N. America, Horn, Tr. Am. Ent. Soc. xiii, n. spp.
- Coræbus (Melybæus) rufipectus*, p. 21, pl. i, fig. 11, *chlorolineatus*, p. 22, W. Africa, Qued., B. E. Z. xxx; *C. davidis*, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 332: n. spp.
- Cisseis dimidiatus*, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 148, n. sp.
- Diphucrania leucosticta* reared from galls on twigs of *Pultanea stipularis*; Elliott, Soc. Ent. i, p. 50.
- Alyssoderus vittatus*, Humpata, Lansb., Notes Leyd. Mus. viii, p. 116, n. sp.

Discoderes mechowii, Quango, p. 22, pl. i, fig. 12, Qued., B. E. Z. xxx, n. sp.

Agrilus, Esch., = (*Ptosima*, auct.) ; Goz., Recherche, p. 21.

Anambus, Th., = (*Agrilus*, auct.) ; Goz., Recherche, p. 21.

Agrilus limoniastri, Algeria, Bed., Bull. Soc. Ent. Fr. (6) vi, p. cxxx, n. sp.

Stenianthe, n. g., near *Ianthé*, for *S. janthina*, Madagascar, n. sp. ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 38.

EUCNEMIDÆ and THROSCIDÆ.

[Cf. Horn (306).]

Xylobius humeralis, Duf., and *alni*, F., characters of ; Kraatz, Deutsche e. Z. xxx, pp. 175 & 176.

Melasis rufipennis, N. America, Horn, Tr. Am. Ent. Soc. xiii, p. 7, n. sp.

Stethon errans, Florida, Horn, Tr. Am. Ent. Soc. xiii, p. 13, n. sp.

Eucnemis capucina, larva described ; Sharp, Tr. E. Soc. 1886, pp. 297-302.

Eucnemis americana, N. America, Horn, Tr. Am. Ent. Soc. xiii, p. 15, n. sp.

Deltopus amœnicornis = (*ereptus*, Bonv.) ; Horn, Tr. Am. Ent. Soc. xiii, p. 16.

Dromaeolus nitens, p. 19, *harringtoni*, p. 21, *pusillus*, p. 23, N. America, Horn, Tr. Am. Ent. Soc. xiii, n. spp.

Fornax infelix, Florida, Horn, Tr. Am. Ent. Soc. xiii, p. 27, n. sp.

Microrhagus audax, p. 32, *bonvouloiri* (= *humeralis*, Bonv., nec Lec.), p. 35, Horn, Tr. Am. Ent. Soc. xiii, n. spp. *M. humeralis*, Say, = (*meticulosus*, Bonv.) : *id. t. c.* p. 37.

Nematodes, Latr., nec auct. = (*Hypocælus*, auct.) ; Goz., Recherche, p. 21.

Hylis, n. n. for *Nematodes*, auct. nec Latr. ; Goz., Recherche, p. 21.

Nematodes pavidus, *teres*, Texas, Horn, Tr. Am. Ent. Soc. xiii, p. 43, n. spp.

Phlegon ulkei, Ohio, Horn, Tr. Am. Ent. Soc. xiii, p. 48, n. sp.

Throscus duvali, Bon., ♀, = (*Trixagus aurociliatus*, Reitt. ; Fauv., Wien. ent. Z. v, p. 75 : this denied by Reitter, *loc. cit.*, who thinks his species may be a sex of *T. exul*).

ELATERIDÆ.

[Cf. Broun (86), Candèze (112), Dubois (154), Fairmaire (175), Heine-mann (281), Heyden (286, 287), Horn (306), Kolbe (359), Quedenfeldt (569), Sharp (655).]

Adelocera, Latr., = (*Lacon*, Cast.) ; Goz., Rev. d'Ent. p. 23.

Archontas, n. n. for *Lacon*, Cast. et auct. ; Goz., Rev. d'Ent. p. 23.

Lacon serricornis, W. Africa, Qued., B. E. Z. xxx, p. 23, pl. i, fig. 13, n. sp.

Tylotarsus subserratus, p. 24, pl. i, fig. 14, *fuscus*, p. 25, W. Africa, Qued., B. E. Z. xxx, n. spp.

Alaus nigrosignatus, Quango, p. 26, pl. i, fig. 15, Qued., B. E. Z. xxx, n. sp.

Lycoreus bicarinatus, Quango, Qued., B. E. Z. xxx, p. 27, pl. i, fig. 16, n. sp.

Chalcolepidius lenzi, p. lxx, *behrensi*, Mexico, *rodriguezi*, Guatemala, *dugesi*, Mexico, p. lxx, *peruanus*, Peru, *forreri*, Mexico, p. lxxii, *inops*, Mexico, p. lxxiii, Cand., C.R. ent. Belg. 1886, n. spp.

Charitophyllus mechowi, W. Africa, Qued., B. E. Z. xxx, p. 28, pl. i, figs. 17 & 18, n. sp.

Pantolamprus nigripes, W. Africa, Qued., B. E. Z. xxx, p. 30, n. sp.

Psephus fulvipes, p. 31, *limbatipennis*, p. 32, *synaptoides*, p. 33, W. Africa, Qued., B. E. Z. xxx, n. spp.

Ischiodontus sulcicollis, W. Africa, Qued., B. E. Z. xxx, p. 33, n. sp.

Heteroderes cuneatus, W. Africa, Qued., B. E. Z. xxx, p. 35, n. sp.

Pyrophorus: cf. Dubois (154), *P. noctilucus*, egg and larva described, *id.* pp. 43-64, the latter figured, pl. i. Heinemann (281).

Æolus, Esch., = (*Heteroderes* auct.); Goz., Recherche, p. 22.

Ææolus, n. n. for *Heteroderes*, auct.; Goz., Recherche, p. 22.

Elater, L. = (*Sericosomus* auct.); Goz., Recherche, p. 22.

Ampedus, Germ. = (*Elater* auct.); Goz., Recherche, p. 22.

Elater præustus, Fab., and its variations described, Buys., Bull. Soc. Ent. Fr. (6) vi, p. xxviii. *E. sanguineus*, n. var. *burdigalensis*, Mediterranean region; *id. t. c.* p. xxvii.

Elater karpaticus, Carpathians, Buys., Bull. Soc. Ent. Fr. (6) v, p. ccxvi; *E. angusticollis*, Asia Minor, Heyd., Deutsche e. Z. xxx, p. 278; *E. subcostatus*, p. 197, pl. x, fig. 20, xi, fig. 30, *analogicus*, p. 198, Korea, Kolbe, Arch. f. Nat. lii, 1 : n. spp.

Megapenthes fusconiger, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 199, pl. xi, fig. 31, n. sp.

Melanoxanthus apicipennis, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 39, n. sp.

Hypnoidus, Steph. = (*Cryptohypnus*, Esch.); Goz., Recherche, p. 22.

Quasimus, n. gen. for *Cryptohypnus minutissimus*, Germ.; Goz., Recherche, p. 22.

Cryptohypnus thoracicus and *frontalis*, Shp. noticed; Sharp, Tr. R. Dublin Soc. (2) iii, p. 400. *C. pallipes*, N. Zealand; *id. loc. cit.*, n. sp.

Cardiophorus fulvescens, *castaneipennis*, p. 36, *gilvipennis*, p. 37, W. Africa, Qued., B. E. Z. xxx : n. spp.

Tarsalgus tibialis, Har. = (*mechowi*, Cand.); Qued., B. E. Z. xxx, p. 38.

Thoramus wakefieldi and *T. obscurus* are the sexes of *T. wakefieldi*; *T. parryi* ♂ noticed; Sharp, Tr. R. Dublin Soc. (2) iii, p. 399. *T. huttoni*, N. Zealand, *id. t. c.* p. 400, n. sp.

Otenicerus, Steph. = (*Corymbites*, Latr.); Goz., Recherche, p. 22.

Selatosomus, Steph. = (*Diacanthus*, Latr.); Goz., Recherche, p. 23.

Corymbites æneus, injurious in cornfields; Ent. Nachr. xii, p. 348. *C. angustulus*, Kies. = (*putonis*, Desb.); Buys., Bull. Soc. Ent. Fr. (6) v, p. cxvii.

Corymbites irregularis, pl. xiii, fig. 2, *mundus*, N. Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 401 : n. spp.

- Diacanthus bipustulatus*, n. var. *semiflavus*; Wien. ent. Z. v, p. 235.
Asymphus, n. g., near *Corymbites*, for *A. insidiosus*, New Zealand, n. sp.; Sharp, Tr. R. Dublin Soc. (2) iii, p. 402.
Ocyasma basalis, New Zealand, Broun, Man. N. Z. Col. p. 957, n. sp.
Psorochroa granulata, Broun, figured; Waterh., Aid, pl. 171, fig. 4.
Melanotus avitus, *morbosus*, Turkestan, Cand., Deutsche e. Z. xxx, p. 186, n. spp.
Athous nigerrimus, Desb., = (*langsдорfi*, Stierl.); Buys., Bull. Soc. Ent. Fr. (6) vi, p. xxviii. *A. spiniger*, Cand., = (*florentinus*, Desb.); *id. t. c. p.* xxix.
Agriotes pilosus, Fab., metamorphoses; Beling, B. E. Z. xxx, pp. 297-300. *A. lineatus*, L., habits of larva, &c.: Orm., Rep. ix, pp. 30-32. *A. sputator* destroyed by a fungus; Bull. Soc. L. N. Fr. vii, p. 111.
Agonischius subsericeus, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 197, n. sp.
Protelater elongatus var. figured, pl. xiii, fig. 3; Tr. R. Dublin Soc. (2) iii.
Protelater vitticollis, p. 956, *atricaps*, p. 957, Broun, Man. N. Z. Col., n. spp.

RHIPIDOCERIDÆ.

[*Cf.* Fairmaire (44).]

- Chamerhipis laligantii*, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 445, n. sp.

DASYLLIDÆ.

[*Cf.* Broun (86), Fairmaire (176), Sharp (655).]

- Eucteis* and *Paralychas* noticed, considered identical; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 336: also *Paralychas guerinii*, Wh., and *E. bimaculata* are probably the same; *id. loc. cit.* (the latter redescribed, p. 335).

- Eucteis rufo-limbata*, Kiang-si, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 336, n. sp.

- Odontonyx pectinata*, Kies., referred to *Eucteis*; Fairm., Ann. Soc. Ent. Fr. (6) vi, pp. 336.

- Dascillus costulatus*, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 333, n. sp.

- Sexual characters of *Microcara*, *Helodes*, *Cyphon*, and *Dascillus* commented on; Bourg., Bull. Soc. Ent. Fr. (6) vi, pp. lxviii & lxix.

- Cyphon*, Payk., = (*Microcara*, Th.); Goz., Recherche, p. 23.

- Contacyphon*, n. n. for *Cyphon*, auct.; Goz., Recherche, p. 23.

- Cyphon signatus*, p. 958, *ethiops*, *trivialis*, p. 959, New Zealand, Broun, Man. N. Z. Col., n. spp.

- Mesocyphon monticola*, *granulata*, New Zealand, Broun, Man. N. Z. Col. p. 958, n. spp.

- Eucinetus subaxillaris* and *substriatus*, Fairm., belong really to *Eustrophus*; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 39.

- Amplectopus*, n. g., anomalous, p. 403, for *A. ovalis*, New Zealand, n. sp., p. 404; Sharp, Tr. R. Dublin Soc. (2) iii.

TELEPHORIDÆ.

[Cf. Bourgeois (74, 21), Broun (86), Emery (169), Fairmaire (174, 175, 176), Gorham (247), Haase (270), Heyden (286, 290), Macleay (411), Olivier (21, 496, 497, 498, 499), Waterhouse (726).]

Lycides.

Lycostomus rubrocinctus, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 338, n. sp.

Lygistopterus 4-costatus, Buq., redescribed; Bourg., Bull. Soc. Ent. Fr. (6) vi, p. xeviii.

Lygistopterus gounellei, Minas Geraes, Bourg., Bull. Soc. Ent. Fr. (6) vi, p. xcix, n. sp.

Metriorhynchus tenuis, serricornis, p. 150, *infuscatus*, p. 151, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, n. spp.

Trichalus nigricauda, Philippines, Bourg., Ann. Soc. Ent. Fr. (6) vi, p. 181; *T. pallidipennis, apicalis*, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 152 : n. spp.

Xylobanus obscurus, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 151, n. sp.

Cladophorus longicornis, apicalis, nigrescens, semirufus, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 152, n. spp.

Calochromus terminatus, Ceylon, Wat., Ann. N. H. (5) xvii, p. 498; *C. formosus*, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 149 : n. spp.

Calopteron picipenne, Perty, and *C. præustum*, Tasch., variation described; Bourg., Bull. Soc. Ent. Fr. (6) vi, pp. xc & xci. *C. limbatum* and *C. serratum*, variations of, described; *id. t. c.* pp. cliv & clv. *C. variegatum*, Kirsch, variation described; *id. t. c.* pp. cxxxix & cliv. *C. angulicolle*, Luc., *tridens*, Tasch., *fossulatum*, Luc., noticed; *id. t. c.* p. clxv.

Calopteron auritum, Brazil, Bourg., Bull. Soc. Ent. Fr. (6) vi, p. cxl; *C. gounellei*, Minas Geraes, *id. t. c.* p. clxiv : n. spp.

Haplobothris setosella, Tejuca, Bourg., Bull. Soc. Ent. Fr. (6) vi, p. cxxx, n. sp.

Emplectus scalaripennis, p. cxxxii, *minarum*, p. clxxxviii, Minas Geraes, Bourg., Bull. Soc. Ent. Fr. (6) vi, n. spp.

Acroleptus, n. g. near *Haplobothris*, for *A. chevrolati*, Rio de Janeiro, n. sp.; Bourg., Bull. Soc. Ent. Fr. (6) vi, p. lxx.

Cænia dimidiata, Fab., habits of larva; Lugger, P. E. Soc. Wash. i, p. 30.

Plateros subæqualis, Tejuca, Bourg., Bull. Soc. Ent. Fr. (6) vi, p. lxxxiv, n. sp.

Lypernes yunnanus, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 338, n. sp.

Ditoneces philippinensis, pusillus, Philippines, Bourg., Ann. Soc. Ent. Fr. (6) vi, p. 181, n. spp.

Homalisus apicalis, Germ., = ? (*Plateros brasiliensis*, Luc.); Bourg., Bull. Soc. Ent. Fr. (6) vi, p. xci.

Lampyrides.

Hyas cruciata, Brazil, Oliv., Rev. d'Ent. v, p. 1, n. sp.

Æthra inexpectata, Brazil, Oliv., Rev. d'Ent. v, p. 2, n. sp.

Vesta menetriesi, Motsch., = (*sumatrensis*, Gorh.); Oliv., Notes Leyd. Mus. viii, p. 191. *V. urens*, Gorh., noticed and described; *id. t. c.* p. 192.

Vesta aurantiaca, Sumatra, Oliv., Notes Leyd. Mus. viii, p. 192, = (*urens*, Oliv., Ann. Mus. Genov. 1885, p. 4); *V. xanthura*, Philippines, Oliv., Ann. Soc. Ent. Fr. (6) vi, p. 182 : n. spp.

Lucernula nigroflava and *flaviventris*, Fairm., belong to *Pyrocelia*; Oliv., Notes Leyd. Mus. viii, p. 196.

Lucernula fumata, Tché-Kiang, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 336, n. sp.

Lucidota oblongo-notata, Tijuca, p. 3, *sexguttata*, Bahia, *oculata*, Minas, p. 4, *inaperta*, Bahia, *pygidialis*, Tijuca, p. 5, Oliv., Rev. d'Ent. v, n. spp.

Photinus sericellus, p. 6, *sulcicollis*, Bahia, p. 7, Oliv., Rev. d'Ent. v, n. spp.

Cratomorphus bicolor, Fab., Mun. Cat. referred to *Pyrocelia*; Oliv., Notes Leyd. Mus. viii, p. 196.

Lamprophorus angustior, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 337, n. sp.

Diaphanes pellucens, Philippines, Oliv., Ann. Soc. Ent. Fr. (6) vi, p. 183; *D. leucopyga*, W. Africa, *dorsalis*, Sumatra, Oliv., Notes Leyd. Mus. viii, p. 193 : n. spp.

Pyrocelia and its species revised; Oliv., Notes Leyd. Mus. viii, pp. 195-208.

Pyrocelia tonkinensis, Tonkin, Oliv., Bull. Soc. Ent. Fr. (6) vi, p. lviii; *P. discoidalis*, Sumatra, p. 198, *signaticollis*, China, p. 199, *straminea*, Java, *rufa*, China, p. 200, *rostrata*, Borneo, p. 201, *amplissima*, China, p. 202, *thibetana*, Thibet, p. 203, *morosa*, Java, p. 205, *consobrina*, Sumatra, p. 207, Oliv., Notes Leyd. Mus. viii : n. spp.

Lampyris, structure of mandibles of larva of; Meinert (434).

Lampyroidea syriaca, Cast., larva described; Bull. Soc. Ent. Fr. (6) vi, p. xxxviii.

Lamprorhiza paulinoi, ♀ described; Oliv., Bull. Soc. Ent. Fr. (6) vi, p. xxxviii.

Colophotia brachyura, p. 185, *concolor*, *miranda*, p. 186, Philippines, Oliv., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Luciola italica, difference in the light of sexes, &c., Emery (169) : summary of Emery's paper; J. R. Micr. Soc. (2) vi, pp. 234 & 235. *L. tentaticollis*, n. n. for *L. vitticollis*, and *costulata*, n. n. for *costipennis*, Fairm.; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 39.

Luciola truncata, p. 183, *angusticollis*, *abdominalis*, *extincta*, p. 184, *rugiceps*, p. 185, Philippines, Oliv., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Photuris, monograph of; Olivier (its synonymy not reproduced here) (496). *P. patagonica*, Boh., is a *Téléphoride*, and *P. inocua*, Boh., and *Ph. (Lampyris) scintillans*, Latr., belong to *Photinus*; Oliv., Ann. Soc. Ent. Fr. (6) vi, p. 205.

Photuris jamaicensis, Jamaica, Oliv., Bull. Soc. Ent. Fr. (6) vi, p. lviii; *P. elliptica*, p. 7, *velox*, p. 8, Minas Geraes, Oliv., Rev. d'Ent. v; *P. trans-*

versa, pl. iii, fig. 1, p. 214, Colombia, *elegans*, p. 214, *picta*, p. 215, pl. iii, fig. 2, *angustata*, p. 216, *infuscata*, p. 217, Brazil, *squalida*, p. 217, Ecuador, *fugax*, p. 219, pl. iii, fig. 3, Brazil, *lepida*, Rio de Janeiro, p. 224, *rugicollis*, *rhagonychioides*, Ecuador, p. 225, *alternans*, Colombia, pl. iii, fig. 5, p. 228, *villosa*, Amazons, p. 229, pl. iii, fig. 11, *binotata*, Argentine Rep., p. 236, *depressa*, pl. iii, fig. 13, p. 240, *ruficeps*, pl. iii, fig. 14, p. 241, *pulchella*, Amazons, pl. iii, fig. 15, p. 242, *signata*, Ecuador, p. 244, *stigmatica*, Guatemala, pl. iii, fig. 18, p. 245, Oliv., Ann. Soc. Ent. Fr. (6) vi : n. spp.

Pyrophanes quadrimaculata, Philippines, Oliv., Ann. Soc. Ent. Fr. (6) vi, p. 187, n. sp.

Zarhipis riversi, Horn, ♀ described, with note on habits ; Rivers, Am. Nat. xx, pp. 648-650.

Rhagophthalmus scutellatus, Motsch. noticed ; Heyd., Deutsche e. Z. xxx, p. 286.

Telephorides.

Photuris patagonica, Boh., belongs to this group ; Oliv., Ann. Soc. Ent. Fr. (6) vi, p. 205.

Bourgeois has issued pp. 101-132 of Vol. iv of the Faune gallo-rhenane, devoted to a portion of Telephorides.

Phengodes, larva noticed ; Riley, Ent. Am. ii, p. 203.

Phengodes uruguayensis, Uruguay, Berg., Bull. Soc. Ent. Fr. (6) vi, p. lix ; *P. hieronymi*, Cordoba, Haase, Ent. Nachr. xii, p. 219 : n. spp., ♂ ♀.

Podabrus majori, Picc., referred to *Malchinus* ; Fiori, Bull. Ent. Ital. 1886, p. 417.

Telephorops, n. gen. near *Telephorus*, for *T. impressipennis*, K. Tchécou, n. sp. ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 339.

Cantharis, application of the name discussed ; Goz., Recherche, p. 23.

Telephorus expansicollis, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 39 ; *T. (?) Haplous basicrus*, p. 339, *rugicollis*, p. 340, Kiang-si, Fairm., id. t. c. : n. spp.

Rhagonycha melanura, tarsal hairs and glands ; Dahl (133), p. 247, pl. xii, fig. 9.

Silis madagascariensis, Wat., described and noticed ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 40.

Aclytia lævigata, N. Zealand, Broun, Man. N. Z. Col., p. 901, n. sp.

Malthinus, Latr. = (*Malthodes*, Kies.) ; Goz., Recherche, p. 23.

Ymnis, n. n. for *Malthodes*, Kies., auct. ; Goz., Recherche, p. 23.

Malthodes captiosus and *parvulus*, sexes noticed ; Schwarz, Ent. Am. ii, p. 139.

Malchinus holomelas, Bulgaria, Fairm., Bull. Soc. Ent. Fr. (6) vi, p. clxii, n. sp.

Drilides.

Drilus, structure of mandibles of larvæ, Meinert (434).

Diplocladon hasseltii, Gorb., figured ; Waterh., Aid, pl. 167, fig. 2.

Læmoglyptus, n. g., p. 334, for *L. fissiventris*, Mou-Pin, n. sp., p. 335 ; Fairm., Ann. Soc. Ent. Fr. (6) vi.

Melyrides.

Myrmecophasma, n. n. for *Myrmecospectra*, Motsch. ; Bourg., Bull. Soc. Ent. Fr. (6) v, p. clxxvii. The position of the genus is in *Malachiles*, not *Ptinides* ; *id.*, t. c.

Apalochrus flavo-limbatus, Muls., larva described ; Muls., Ann. Soc. L. Lyon, xxx, pp. 437-439.

Collops tricolor, Horn, gynandromorphous ex. figured ; Gorh., Biol. Centr. Am. Col. iii (2), pl. xiii, figs. 1 & 1a.

Collops frontalis, Mexico, p. 314, *intermedius*, Panama, p. 315, Gorh., Biol. Centr. Am. Col. iii (2), n. spp.

Attalus verberatus, p. 318, *tabogensis*, *fuscescens*, A. (?) *calcaratus*, p. 319, Panama, *subfasciatus*, pl. xiii, fig. 2, *caelestinus*, Mexico, *carinatus*, Panama, pl. xiii, fig. 4, p. 320, Gorh., Biol. Centr. Am. Col. iii (2), n. spp.

Anthocomus hepburnius, Mexico, *opalinus*, Panama, p. 317, Gorh., Biol. Centr. Am., n. spp.

Ebaeus punctatus, Panama, p. 321, Gorh., Biol. Centr. Am., n. sp.

Lemphus serricornis, pl. xiii, fig. 5, p. 321, Gorh., Biol. Centr. Am., n. sp.

Holomallus, n. g. near *Cymbolus*, p. 325, for *N. auricillus*, Mexico, n. sp., p. 326 ; Gorh., Biol. Centr. Am.

Cymbolus, n. g. (*Dasytides*), p. 324, for *C. castaneus*, Mexico, *rufo-piceus*, pl. xiii, fig. 12, p. 324, *punctipennis*, p. 325, Guatemala, n. spp., Gorh., Biol. Centr. Am. Col. iii (2).

Pristoscelis aeneipennis, p. 327, *femoralis*, Mexico, *fulvipes*, Guatemala, p. 328, Gorh., Biol. Centr. Am., n. spp.

Dromanthus laticornis, *nitidicollis*, pl. xiii, fig. 6, Panama, p. 322, *discoideus*, Parana, p. 323, note, Gorh., Biol. Centr. Am., n. spp.

Carpurus cyaneipennis, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 153, n. sp.

Dasytes cheesemani, *opaculus*, New Zealand, Broun, Man. N. Z. Col. p. 902, n. spp.

Lasius, Motsch., = (*Psilothrix*, Redt.) ; Goz., Recherche, p. 24.

Listrus : *Pristoscelis cruralis*, Lec., referred to this ; Horn, P. Am. Ent. Soc. xiii, p. xiii.

Listrus impressus, Mexico, *pygmæus*, Panama, p. 329, *ferrugineus*, Mexico, p. 330, Gorh., Biol. Centr. Am. Col. iii (2), n. spp.

Amauronia contracta, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 446, n. sp.

Julistus constrictus, Morocco, Fairm., Bull. Soc. Ent. Fr. (6) p. clxxviii, n. sp.

Amalthocus, n. g. near *Amauronia*, p. 40, for *M.* (sic) *tetraspilus*, Madagascar, n. sp., p. 41 ; Fairm., Ann. Soc. Ent. Fr. (6) vi.

Astylus octopustulatus, Panama, pl. xii, fig. 25, p. 330, Gorh., Biol. Centr. Am. Col. iii (2), n. sp.

Melyris amalix, Constantine, Heyd., Ber. senck. Ges. 1886, p. 56, n. sp.

Helcogaster (?) *atratus*, Guatemala and Panama, Gorh., Biol. Centr. Am. Col. iii (2), p. 323, n. sp.

Anthodromius turkestanicus, Turkestan, Heyd., Deutsche e. Z. xxx, p. 186, n. sp.

Xamerpus, n. g. near *Pelecophorus*, for *X. vageguttatus*, Madagascar, n. sp.; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 41.

Melyrodes perforata, Panama, Gorh., Biol. Centr. Am. Col. iii (2), n. sp.

Antixoon, n. g. (to follow *Melyrodes*) for *A. cribripenne*, Panama, n. sp., pl. xiii, fig. 13; Gorh., Biol. Centr. Am. Col. iii (2), p. 332.

CLERIDÆ.

[Cf. Fairmaire (174, 175), Gorham (247), Kolbe (360).]

The Madagascar species of the family reviewed; Fairm., Ann. Soc. Ent. Fr. (6) vi, pp. 42-72: they amount to 61 species, included in 17 genera.

Tillus collaris, Spin., figured, pl. xiii, fig. 7; Gorh., Biol. Centr. Am. Col. iii (2).

Tillus multicolor, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 43, n. sp.

Pallenis rugulicollis, p. 47, *semiazurea* (Nossi Bé), *angustiformis*, p. 48, *diversiventris*, p. 49, *bifascis*, p. 51, *biconigera*, p. 52, *divisicollis*, p. 53, *plicata*, pl. ii, fig. 5, *tuberipilosa*, p. 54, *arcitenens*, p. 55, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Stenocylihdrus cyaneo-niger, *griseo-caudatus*, *nigratus*, p. 56, *longepunctatus*, p. 57, *minor*, *melaleucus*, *melanocrossus*, p. 58, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Rhopoloclerus, n. g., near *Stenocylihdrus*, for *R. coquerelii*, Madagascar, n. sp.; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 60.

Tilloclerus fulvo-arcuatus, p. 61, *aurosus*, p. 62, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Liostylus, n. g., near *Stenocylihdrus*, p. 62, for *L. stricticollis*, *anthicoides*, p. 63, n. spp., Madagascar; Fairm., Ann. Soc. Ent. Fr. (6) vi.

Cymatodera sericans, p. 333, *saturata*, pl. xiii, fig. 8, Panama, Gorh., Biol. Centr. Am. Col. iii (2), n. spp.

Colyphus bilineatus, pl. xiii, fig. 10, p. 335, *nigriventris*, Guatemala and Panama, *reducens*, pl. xii, fig. 22, p. 336, *gracilis*, pl. xiii, fig. 19, p. 337, Panama, Gorh., Biol. Centr. Am. Col. iii (2), n. spp.

Pæcilochroa varia, *plumbea*, pl. xiii, fig. 11, p. 337, Mexico, *frontalis*, Guatemala, p. 338, Gorh., Biol. Centr. Am. Col. iii (2), n. spp.

Opilo lignicolor, *biocellatus*, p. 64, *brunneotinctus*, pl. ii, fig. 6, p. 65, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Clerus puellus, Guatemala, *plagiatus*, pl. xii, fig. 21, p. 339, *villicus*, p. 340, Panama, Gorh., Biol. Centr. Am. Col. iii (2), n. spp.

Platyclerus raffrayi, p. 67, *metallinus*, Madagascar, *communimacula*, Nossi Bé, p. 68, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Tarsostenus unvittatus destroying *Lyctus canaliculatus*, Luc., Bull. Soc. Ent. Fr. (6) vi, p. clxxiv.

Trichodes (sub *Clerus*) *lepidus*, Walk., redescribed from Obock; Fairm., Ann. Soc. Ent. Fr. (6) v, p. 447. *T. alvearius*, F., habits of larva noticed; Lampert, JH. Ver. Württ. xlii, p. 99.

Trichodes spinolæ, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 199, pl. xi, fig. 32, n. sp.

Eburifera nitidicollis, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 70, n. sp.

Epiphlaeus princeps, Panama, pl. xii, fig. 19, p. 340, Gorh., Biol. Centr. Am. Col. iii (2), n. sp.

Hydnocera suturalis, Kl., noticed, p. 341; *H. furcata*, pl. xiii, fig. 14, *rudis*, p. 342, Mexico, *cylindricollis*, pl. xiii, fig. 16, Nicaragua and Panama, *vitrina*, Mexico and Panama, pl. xiii, fig. 15, p. 343, n. spp., Gorh., Biol. Centr. Am. Col. iii (2).

Ichneua vittaticollis, Gorh., figured, pl. xii, fig. 24; Biol. Centr. Am. Col. iii (2).

Chariessa elegans, Horn, figured, pl. xii, fig. 23; Biol. Centr. Am. Col. iii (2).

Pelonium luridum, Panama, pl. xii, fig. 20, p. 346, Gorh., Biol. Centr. Am. Col. iii (2), n. sp.

Enoplioides, n. g., near *Enoplium*, for *E. oberthurii*, Madagascar, n. sp., Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 44.

Myrmecomæa, n. g., near *Pallenis*, p. 44, for *M. raffrayi*, pl. ii, fig. 4, *strangulata*, p. 45, *simplicipes*, p. 46, Madagascar, n. spp., Fairm., Ann. Soc. Ent. Fr. (6) vi.

LYMEXYLONIDÆ and CUPESIDÆ.

[Cf. Kolbe (360).]

Limexylon, F., = (*Hylecætus*, auct.) ; Goz., Recherche, p. 24.

Pterophorus, Hbst., = (*Limexylon*, auct.) ; Goz., Recherche, p. 24.

Limexylon navale, L., habits in England ; Orm., Rep. x, pp. 77-80.

Cupes raffrayi figured ; Fairm., Ann. Soc. Ent. Fr. (6) vi, pl. ii, fig. 7.

Cupes anguliscutis, Korea, Kolbe, Arch. f. Nat. lii (1) p. 200, pl. xi, fig. 33, n. sp.

PTINIDÆ.

[Cf. Broun (86), Fairmaire (174), Gorham (247), Heyden (286), Olliff (502), Poll (544), Sharp (655).]

Ptinides.

On the previous stages of *Ptinidæ* and allied groups ; Hagen, Canad. Ent. xviii, pp. 153-157.

Myrmecospectra, cf. *Melyrides*.

Ptinus adeps, *eminens*, p. 834, *attritus*, p. 835, *imulus*, *egenus*, p. 836, *longus*, p. 837, Australia, Oll., P. Linn. Soc. N.S.W. x, n. spp.

Diphobia, n. g., p. 837, between *Ptinus* and *Diplocotes*, for *D. familiaris*, Australia, n. sp., p. 838 ; Oll., P. Linn. Soc. N.S.W. x.

Enasiba, n. g., p. 838, near *Diphobia*, for *E. tristis*, Australia, n. sp., p. 839 ; Oll., P. Linn. Soc. N.S.W. x.

Diplocotes foveicollis, Australia, Oll., P. Linn. Soc. N.S.W. x, p. 839 ; *D. niger*, Australia, Poll, Notes Leyd. Mus. viii, p. 238 : n. spp.

Trigonogenius arcuatus, Panama, pl. xiii, fig. 20, p. 347, Gorh., Biol. Centr. Am. Col. iii (2), n. sp.

Niptus fausti, Turkestan, Heyd., Deutsche e. Z. xxx, p. 187, n. sp.

Outipmus, n. subg. of *Sphericus* ; Goz., Recherche, p. 24.

Anobiides.

Anobium, F., = (*Xestobium*, Motsch.) ; Goz., Recherche, p. 24.

Byrrhus, Geof., = (*Anobium* auct.) ; Goz., Recherche, p. 24.

Anobium sericatum, Gorh., figured, pl. xiii, fig. 17 ; Biol. Centr. Am. Col. iii (2).

Anobium ? *alternatum*, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 448, n. sp.

Perplectrus, n. n. for *Xenocera*, Broun (but cf. Zool. Rec. xix, Ins. p. 83), characters given ; *P. obscurus*, n. sp., New Zealand, pl. xiii, fig. 4 ; Sharp, Tr. R. Dublin Soc. (2) iii, p. 405.

Macranobium, n. g. allied to *Trypopityus*, for *M. truncatum*, n. sp., p. 904.

Theca breviscula, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 447, n. sp.

Dulgieris, n. g. for *Ochina latreillei*, Bon. ; Goz., Recherche, p. 25.

Lioolius exiguus, Honduras, Gorh., Biol. Centr. Am. Col. iii (2), p. 347, n. sp.

Thaptor sharpi, Mexico, Gorh., Biol. Centr. Am. Col. iii (2), p. 348, n. sp.

Cathorama puncticeps, Mexico, Guatemala, p. 348, Gorh., Biol. Centr. Am. Col. iii (2), n. sp.

Mirosternus brunneivillis, pl. xiii, fig. 18, *substriatus*, Panama, p. 349, Gorh., Biol. Centr. Am. Col. iii (2), n. spp.

Priotoma, n. g., p. 350, for most of the Central American species of *Dorcatoma*, and for *P. brevis*, *tenuistriata*, Panama, n. spp., p. 351 ; Gorh., Biol. Centr. Am. Col. iii (2).

BOSTRICHIDÆ.

[Cf. Gorham (247), Horn (305), Macleay (411), Quedenfeldt (572).]

Bostrichus morbillosus (Dej.), Quango river, Quedf., B. E. Z. xxx, p. 325, n. sp.

Dinapate, n. g., p. 1, for *D. wrightii*, California, n. sp., with larva, p. 2, pl. i ; Horn, Tr. Am. Ent. Soc. xiii.

Apate punctipennis, Lec. ?, = (*migrator*, Shp.) ; Gorh., Biol. Centr. Am. Col. iii (2), p. 352.

Xylopertha polita, Angola, Quedf., B. E. Z. xxx, p. 327, pl. viii, fig. 11, n. sp.

Dinoderus perfoliatus, Panama, pl. xiii, fig. 25, p. 353, n. sp. ; Gorh., Biol. Centr. Am. Col. iii (2).

Rhizopertha papuensis, New Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 154, n. sp.

Psoa maculata and *quadrisignata*, characters and variation, with woodcuts ; Horn, P. Am. Ent. Soc. xiii, p. xv.

Xylotrogus, Steph., to be used for *Lyctus* auct. ; Goz., Recherche, p. 11.

Lyctus canaliculatus, cf. *Tarsostenus univittatus*, sub *Cleridis*.

CIOIDÆ.

[Cf. Broun (86), Gorham (247), Reitter (573).]

Cis setifer, Lenkoran, Reitt., Radde Faun. Casp. p. 226 ; *C. tetracentrum*, N. America, Mexico, pl. xiii, fig. 22, *bituberculatus*, *subfuscus*, Mexico

p. 357, *cylindrus*, Panama, p. 358, Gorch., Biol. Centr. Am. Col. iii (2); *C. fultoni*, *piciceps*, New Zealand, Bronn, Man. N. Z. Col. p. 904 : n. spp. *Malacocis*, n. g. for *M. championi*, Guatemala, n. sp., p. 356; Gorch., Biol. Centr. Am. Col. iii (2).

Ceracis militaris and *furcifer* noticed; *O. quadricornis*, Mexico, n. sp.; Gorch., Biol. Centr. Am. Col. iii (2).

Xylographus, the genus noticed, p. 354; *X. suillus*, pl. xiii, figs. 21 & 21a, *porcus*, *latirostris*, pl. xiii, figs. 23 & 24, Guatemala, n. spp., p. 355; Gorch., Biol. Centr. Am. Col. iii (2).

TENEBRIONIDÆ and CISTELIDÆ.

[*Cf.* Brönn (86), Casey (118), Champion (247), Dohrn (145), Fairmaire (21, 174, 175, 176), Heyden (286), Kirsch (354), Kolbe (360, 362), Macleay (411), Poll (545), Reitter (573, 589, 590), Sharp (655).]

Zophosides, *Erodiides*, *Tentyriides*.

Zophosis acuticosta, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 448, n. sp.

Annodeis asiaticus, Mill. = (*wagneri*, Chev.); Fairm., Bull. Soc. Ent. Fr. (6) v, p. ccv. *A. confluens* = (*nitidus*, Chev.), *id. loc. cit.*

Thinobatis rufinasus, Ecuador, Kirsch, B. E. Z. xxx, p. 331, n. sp.

Epitragides, *Stenosides*.

Epitragus puberulus, Colombia, Kirsch., B. E. Z. xxx, p. 332, n. sp.

Stenosis kraatzii, India, *carinipennis*, Abyssinia, p. 103, *gestroi*, Abyssinia, *lateralis*, N. Africa, p. 104, *indica*, Madras, p. 105, *opaca*, Oran, p. 112, *pilosiuscula*, Abyssinia, p. 116, *pleuralis*, E. India, p. 119, *intricata*, Balearic Isles, p. 120, *turkestanica*, Turkestan, *mülleri*, Hedjaz, p. 123, *ruficornis*, Abyssinia, p. 124, Reitt., Deutsche e. Z. xxx : n. spp.

Eutagenia tenuitarsis, Cape Good Hope, Reitt., Deutsche e. Z. xxx, p. 127, n. sp.

Dichillus cordicollis, Samarcand, p. 134, *tenebrosus*, Turcomania, p. 136, *heydeni*, *nitidulus*, Syria, p. 137, *dolosus*, Syria, *lævicornis*, Morocco, p. 138, *duricornis*, South Spain ?, p. 139, *subsetulosus*, Asia Minor, p. 140, *strigiceps*, Aleppo, p. 141, Reitt., Deutsche e. Z. xxx : n. spp.

Discopleurus acuminatus, Chili, Reitt., Deutsche e. Z. xxx, p. 99, n. sp.

Blaptides, *Asidides*, *Nycteliides*, *Pimeliides*.

Cælocnemodes, Bates, discussed and recharacterized; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 341.

Cælocnemodes aspericollis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. sp.

Asidoblaps, n. g., near *Cælocnemodes*, for *A. davidis*, p. 342, *glyptoptera*, p. 343, Yunnan, n. spp.; Fairm., Ann. Soc. Ent. Fr. (6) vi.

Tagonoides, n. g., p. 343, near *Asidoblaps*, for *T. delavayi*, Yunnan, p. 343, and *pustulosa*, China, p. 344, n. spp.; Fairm., Ann. Soc. Ent. Fr. (6) vi.

Blaps rhynchoptera, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 344, n. sp.

Prosodes costifera, p. 187, *fallax*, p. 189, Heyd., Deutsche e. Z. xxx, n. spp.

Leptomorpha prolongata, Laddak, Fairm., Bull. Soc. Ent. Fr. (6) vi, p. clxxix, n. sp.

Asidobothris, n. g., near *Asida*, for *A. clathrata*, n. sp., Madagascar, pl. ii, fig. 8; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 72.

Gyriosomus crispaticollis, *grano-costatus*, *coriaceus paulseni*, Chili, Fairm., Bull. Soc. Ent. Fr. (6) vi, p. clxx, n. spp.

Epipedonota alticola, p. 332, *opaca*, p. 333, Bolivia, Kirsch, B. E. Z. xxx, n. spp.

Cerostena cf. *Cerosterna* in *Cerambycidae*, p. 182.

Pimelia hemispherica, Sol. = (*capillata*, Sol. = *insignis*, Fairm.); Sénac, Bull. Soc. Ent. Fr. (6) vi, p. xxii. *P. hildebrandti*, Har. = (*ceuchronota*, Fairm.); *id. t. c.* p. xxxix.

Pimelia scabricollis, Algeria, *orientalis*, Syria, p. xlv, *gracilipes*, Persia, p. xlvi, Sénac, Bull. Soc. Ent. Fr. (6) vi, n. spp.

Molurides.

Distretus undosus, Congo, Kolbe, Ent. Nachr. xii, p. 291, n. sp.

Distretus mechowi, Qued., belongs to *Amiantus*; Kolbe, Ent. Nachr. xii, p. 291.

Amiantus picteti, Haag, teratology; Bull. Soc. Ent. Fr. (6) vi, p. clxxxix.

Amiantus lobicollis, Nyam Nyam, p. 291, *costipennis*, Transvaal, *reichardi*, Tanganyka, p. 292, Kolbe, Ent. Nachr. xii, n. spp.

Psammyrussus, n. g., near *Psanmodes*, p. 289, for *P. titanus*, Congo, n. sp., p. 290; Kolbe, Ent. Nachr. xii.

Dichtha quedenfeldtii, Lake Nyassa, Kolbe, Ent. Nachr. xii, p. 293, n. sp.

Pedinides, Opatrides.

Platyscelis latipes, Kraatz, Deutsche e. Z. xxx, p. 189; *P. punctatissima*, Pekin, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 345: n. spp.

Isocerus ferrugineus, Hbst., and allies discussed and differentiated; Reitt., Wien. ent. Z. v, p. 151.

Clitobius, Muls., = (*Halonomus*, Woll.); Fairm., Bull. Soc. Ent. Fr. (6) v, p. ccv. List of the species and correction of locality of *C. ovatus* (from Bengale to Benguela); *id. t. c.* p. ccvi.

Opatrum tuberculicostatum, White (cf. *Helopides*, *Pseudopatrum*).

Syrphetodes bullatus, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 407, n. sp.

Trachyscelides, Bolitophugides, Crypticides.

Trachyscelis tenuestriatus, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 449, n. sp.

Phaleria proliza, Fairm., = (*munda*, Walk.); Fairm., Ann. Soc. Ent. Fr. (6) v, p. 437.

Phaleria guatemalensis, Guatemala, pl. x, fig. 1, *panamensis*, Panama, *dytiscoides*, Brit. Honduras to Nicaragua, pl. x, fig. 2, p. 218, *margini-* 1886. [VOL. XXIII.]

pennis, Mexico, *opacicollis*, Panama, p. 219, *parifica*, *neotropicalis*, pl. x, fig. 3, Guatemala, p. 220, *insularis*, Tres Marias islands, pl. x, fig. 4, p. 221, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Bycrea villosa figured, pl. x, fig. 5, Biol. Centr. Am.

Scaptus, n. g. (Dej., Cat.), p. 222, for *S. cayennensis* (Dej.), Guiana, p. 222, note, *squamulatus*, Mexico to Amazons, pl. x, fig. 6, p. 223, n. spp.; Champ., Biol. Centr. Am. Col. iv (1).

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Calymmus variegatus, Nicaragua, pl. x, fig. 8, *scabriculus*, Ecuador, p. 225, *vestitus*, Peru, Brazil, p. 226, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Ozolaïs verrucosa, Panama, pl. x, fig. 9, p. 226, *lutosa*, Costa Rica, pl. x, fig. 10, p. 227, *nodosa*, *elongata*, pl. x, fig. 11, Nicaragua, p. 228, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Eleates, n. g., near *Bolitophagus*, p. 253, for *E. occidentalis*, California, n. sp., p. 254, pl. vii, fig. 19; Casey, Bull. Cal. Ac. Sci. ii.

Crypticus ovatus, Guatemala, *mexicanus*, Mexico, p. 137, *aterrimus* (Dej., Cat.), Mexico to Guiana, *maculatus*, Guatemala and Nicaragua, pl. vii, fig. 1, p. 138, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Diaperides.

Leiochrinus (Leiochritina) purpuripennis, Assam, Poll., Notes Leyd. Mus. viii, p. 34, n. sp.

Corticeus rufipes? figured, pl. viii, fig. 4; *C. longicornis*, Mexico, *puncticollis*, Guatemala, p. 172, *pallidipennis*, pl. viii, fig. 5, Mexico, Guatemala, *crassicornis*, Guatemala, pl. viii, fig. 6, p. 173, Champ., Biol. Centr. Am. Col. iv (1); *C. basalis*, Caspian region, Reitt., Radde Faun. Casp. p. 228: n. spp.

Diaperis maculata, Ol., = (*suturalis*, Chev.); Champ., Biol. Centr. Am. Col. iv (1) p. 174.

Hoplocephala quadricornis, Lenkoran, Reitt., Radde Faun. Casp. p. 227, n. sp.

Arrhenoplita, Kirb., used in place of *Hoplocephala*; Champ., Biol. Centr. Am. Col. iv (1), p. 175.

Arrhenoplita clavicornis, pl. viii, fig. 7, p. 176, *distans*, pl. viii, fig. 8, *obsoleta*, p. 178, Mexico, *nigricornis*, *inermis*, Guatemala, p. 179, *cioides*, Panama, pl. viii, fig. 9, *pentaphylloides*, Guatemala, p. 180, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Evoplus, Lec., merged in *Arrhenoplita*; Champ., Biol. Centr. Am. Col. iv (1).

Saptine, n. g., p. 180, for *S. ovata*, Mexico, n. sp., pl. viii, fig. 10, p. 181; Champ., Biol. Centr. Am. Col. iv (1).

Platyedema: the limits of the genus, p. 181; Central American species tabulated, pp. 182 & 184; *P. excavatum*, pl. viii, fig. 11, *undatum*, figs. 13 & 14, *diophthalmum*, fig. 16, *transversum*, fig. 17, *bisignatum*, fig. 18, *sex-notatum*, fig. 20, *ornatum*, fig. 22, *tibiale*, fig. 25, *maculatum*, figs. 26 & 27, *versicolor*, pl. ix, fig. 3, *dimidiatum*, fig. 7, *elegans*, fig. 8, figured; *P. janus* and *sobrinum*, synonymy discussed, p. 189; *P. ferrugineum*,

Chev., = (*biimpressum*, Chev.), p. 190; Champ., Biol. Centr. Am. Col. iv (1).

Platydema rodriguezi, Guatemala, pl. viii, fig. 15, p. 185, *hondurenses*, Brit. Honduras, *viriditinctum*, p. 186, *mexicanum*, pl. viii, fig. 12, p. 187, *melancholicum*, Guatemala, p. 190, *rugiceps*, Mexico to Nicaragua, *oculatum*, Mexico, p. 191, *nicaraguense*, Nicaragua, *immaculatum*, Panama, p. 192, *bimaculatum*, Mexico to Guiana, p. 193, *högei*, Mexico, pl. viii, fig. 19, p. 195, *guatemalense*, Guatemala, pl. viii, fig. 21, *pretiosum*, Brit. Honduras, pl. viii, fig. 23, p. 197, *panamense*, pl. viii, fig. 24, p. 198, *nigromaculatum*, pl. ix, figs. 1 & 2 (with var. from Nicaragua), p. 199, Panama, *breve*, Mexico to Panama, pl. viii, fig. 28, *tricolor*, Guatemala, pl. ix, fig. 4, p. 200, *biplagiatum*, Mexico to Panama, pl. ix, figs. 5 & 6, *maculipenne*, Mexico, Guatemala, p. 201, *lucens*, pl. ix, fig. 9, p. 202, *cordovense*, pl. ix, fig. 10, Mexico, *unicolor*, Nicaragua, pl. ix, fig. 11, p. 203, *venustum*, Nicaragua and Panama, pl. ix, fig. 12, p. 204, Champ., Biol. Centr. Am. iv (1), n. spp.

Liodema kirschi, Bates, = (*Scaphidema tergocinctum*, Chev., and *L. inscriptum*, Chev., also ? *L. fulvum*, Bates), p. 205, figured, pl. ix, fig. 13; *L. convexum*, Bates, = (*cruciatum*, Chev., and *nigrofusciatum*, Chev.), p. 207, figured, pl. ix, figs. 15 & 16; *L. serricorne* figured, pl. ix, fig. 17; Champ., Biol. Centr. Am. iv (1).

Liodema zimmermani, Guatemala, pl. ix, fig. 14, p. 206, *flavovariegatum*, Panama, pl. ix, fig. 18, p. 208, Champ., Biol. Centr. Am. iv (1), n. spp.

Stenoscapa jalapensis, Mexico, Champ., Biol. Centr. Am. Col. iv (1), pl. ix, fig. 19, p. 208, n. sp.

Paniasis, n. g., p. 208, for *P. dilatipes*, Mexico, n. sp., pl. ix, fig. 22, p. 209; Champ., Biol. Centr. Am. Col. iv (1).

Lelegeis, n. g., p. 209, for *L. æneipennis*, Mexico, n. sp., pl. ix, fig. 23, p. 210; Champ., Biol. Centr. Am. Col. iv (1).

Cosmonota nigripes, Chev., figured, pl. ix, fig. 20; *C. pubescens*, Nicaragua, pl. ix, fig. 21, p. 210, Champ., Biol. Centr. Am. Col. iv (1), n. sp.

Hapsida chrysomelina, pl. ix, fig. 24, *boucardi*, = (*geminata* and *grammica*, Chev.), p. 215, pl. ix, figs. 27 & 28, figured; Champ., Biol. Centr. Am. Col. iv (1).

Hapsida gibbosa, Mexico and Guatemala, *seriatopunctata*, Mexico, pl. ix, fig. 25, p. 212, *punctipennis*, Guatemala, p. 213, *terebrans*, Brit. Honduras to Panama, pl. ix, fig. 26, p. 214, Champ., Biol. Centr. Am. Col. iv (1), n. sp.

Gonospa, n. g., p. 216, for *G. amazonica*, *brasiliensis*, Amazons, p. 216, note, *phædonoides*, Panama, pl. ix, fig. 29, p. 217, n. spp.; Champ., Biol. Centr. Am. Col. iv (1).

Pentaphyllus nitidulus, Lenkoran, Reitt., Radde Faun. Casp. p. 228, n. sp.

Phrenapatides.

Daochus, n. g., p. 139, near *Delognatha*, for *D. mandibularis*, Brit. Honduras, n. sp., pl. vii, fig. 2, p. 140; Champ., Biol. Centr. Am. Col. iv (1).

Ulomides.

Components of the group noticed; Champ., Biol. Centr. Am. Col. iv (1), pp. 140 & 141.

Peneta mülleri, Colombia; *haagii*, Ecuador, Kirsch, B. E. Z. xxx, p. 334; *P. panamensis*, Panama, pl. vii, fig. 3, p. 142, Champ., Biol. Centr. Am.: n. spp.

Cleolaus, n. g. (for *Peneta*, sect. 1, B. Lac.); *C. sommeri*, Lac., figured; Champ., Biol. Centr. Am. Col. iv (1), p. 142.

Telchis, n. g., p. 142, for *T. clavicornis*, Panama, n. sp., pl. vii, fig. 5, p. 143; Champ., Biol. Centr. Am. Col. iv (1).

Arrhabæus, n. g., p. 144, for *A. convexus*, Costa Rica and Panama, n. sp., pl. vii, fig. 6, p. 145; Champ., Biol. Centr. Am. Col. iv (1).

Echocerus analis, Guatemala, pl. vii, fig. 7, p. 146, Champ., Biol. Centr. Am. Col. iv (1), n. sp.

Sicinus, n. g., p. 146, for *S. guatemalensis*, pl. vii, fig. 10, *brevipes*, Guatemala, p. 147; n. spp.; Champ., Biol. Centr. Am. Col. iv (1).

Iecius, n. g., p. 147, for *I. cephalotes*, Mexico and Guatemala, pl. vii, fig. 8, *cylindricus*, Guatemala, fig. 9, n. spp., p. 148; Champ., Biol. Centr. Am. Col. iv (1).

Alegoria sallei figured, pl. vii, fig. 11; Biol. Centr. Am. Col. iv (1).

Pheres, n. g., for *P. batesi*, Panama, n. sp., pl. vii, fig. 12; Champ., Biol. Centr. Am. Col. iv (1), p. 150.

Uleda, Cast., full characters given; *U. grossa*, Mexico to Brazil, n. sp., pl. vii, fig. 13, p. 151; Champ., Biol. Centr. Am. Col. iv (1).

Uloma mexicana (Dej.), Mexico to Costa Rica, pl. vii, fig. 14, p. 152, *fossulata* (Dej.), Mexico and Guatemala, *laevicollis*, Mexico to Panama, p. 153, *armata*, Brit. Honduras, Guatemala, pl. vii, fig. 16, p. 154, *spinipes*, pl. vii, fig. 17, *divergens*, fig. 18, Guatemala, p. 155, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Uloma retusa, n. var. (*dimidiata*, Dej.), figured, pl. vii, fig. 15; Biol. Centr. Am. Col. iv (1). *U. perroudi* and *culinaris* differentiated; Th., Bull. Soc. Ent. Fr. (6) vi, p. x.

Uloma lutimanus, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 202, pl. xi, fig. 34, n. sp.

Cutaphronetis angustula, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 449, n. sp.

Clamoris, n. n. for *Phthora*, Muls., nec Germ.; Goz, Recherche, p. 25.

Clamoris insurgens, Goz., n. n., = (*Phthora crenata*, Muls.); Goz., Recherche, p. 25.

Apthora glabritursis, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 408, n. sp.

Cynaëus opacus, Mexico, Champ., Biol. Centr. Am. Col. iv (1), p. 156, n. sp.

Doliema cucujiformis, Mexico to Colombia, p. 158, *frontalis*, Brit. Honduras and Amazons, pl. vii, fig. 24, *angustata*, Guatemala, pl. vii, fig. 25, p. 159, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Sitophagus fuliginosus, pl. viii, fig. 1, p. 161, *dilatifrons*, pl. vii, fig. 22, Guatemala, *S. (?) cynaeoides*, Mexico, pl. viii, fig. 2, p. 163, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Sitophagus hololeptoides = (*solieri*, Muls., *castaneus*, Reitt., *Adelina farinaria*, Woll.) ; Champ., Biol. Centr. Am. Col. iv (1), p. 161.

Ulosonia canaliculata, Nicaragua to Panama, *depressa*, Mexico, p. 164, *dejeani*, Guatemala and Columbia, pl. vii, fig. 19, p. 165, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Peltoides reflexus, Chev., referred to *Metulosonia* ; Champ., Biol. Centr. Am. Col. iv (1), p. 166.

Phayllus, n. g., p. 167, for *P. minutus*, n. sp., Mexico to Brazil (? *Hyppogena minuta*, Dej., Cat.), pl. vii, fig. 21 ; Champ., Biol. Centr. Am. Col. iv (1).

Æsymnus, n. g., for *Æ. nitidus*, Mexico, n. sp., pl. vii, fig. 23 ; Champ., Biol. Centr. Am. Col. iv (1), p. 168.

Mophis, n. g., p. 168, for *M. marginicollis*, Guatemala, pl. viii, fig. 3, *affinis*, *atterrinus*, Mexico, p. 169, n. spp. ; Champ., Biol. Centr. Am. Col. iv (1).

Leptoscapa, n. n. for *Stenoscapha*, Fairm. (*nec* Bates) ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 73.

Tenebrionides.

Ozenimorphus costulipennis, Fairm. (1882), gen. and sp. redescribed ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 73.

Nyctozoilus crenaticollis, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 154, n. sp.

Nyctobates manillarum, Philippines, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 188, n. sp.

Amenophis, Th., characters noticed, species tabulated ; *Nyctobates mechowi*, Kolbe, and *iphithinoides*, Quedf., referred to it, pp. 294 & 295 ; *A. nyctobatoides*, Nyam-Nyam, *büttneri*, Gaboon, *purpurata*, Quango river, Kolbe, Ent. Nachr. xii : n. spp.

Dischidus, n. g., p. 297, to include some of the African species of *Nyctobates*, *sinuatus*, *punctatus*, F., *hypocrita*, West., *e.g.*, and *D. aeneipennis*, Congo, n. sp., p. 298 ; Kolbe, Ent. Nachr. xii.

Derospharus simillimus, Philippines, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 188, n. sp.

Mitys, Champ. (*cf.* *Helopides*).

Goniadera oculata, pl. x, fig. 12, *nicaraguensis*, pl. x, fig. 13, Nicaragua, *pilosa*, Nicaragua to Panama, pl. x, fig. 14, p. 230, *alternata*, Mexico to Panama, pl. x, fig. 15, p. 231, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Xanthicles, n. g., p. 231, for *X. caraboides*, pl. x, fig. 16, *hirsutus*, Costa Rica, p. 232, n. spp. ; Champ., Biol. Centr. Am. Col. iv (1).

Aneodus similis, Mexico to Nicaragua, p. 234, *mexicanus*, Mexico, pl. x, fig. 17, p. 234, *maculatus*, Panama, *longicornis*, Mexico, Guatemala, p. 235, *marginatus*, pl. x, fig. 18, *apicicornis*, pl. x, fig. 19, Panama, *brevicollis*, Guatemala, pl. x, fig. 20, p. 236, *setulosus*, Nicaragua to Colombia, pl. x, fig. 21, p. 237, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Heterotarsides.

Heterotarsus subcrenatus, p. 345, *aphodioides*, p. 346, China, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Paratenetus tibialis, Mexico to Guatemala, pl. x, fig. 22, *ruficornis*, Panama, pl. x, fig. 23, p. 239, *villosus*, Mexico to Panama, pl. x, fig. 24, p. 240, *corticurioides*, Mexico, Guatemala, *obovatus*, Brit. Honduras, p. 241, *crenulatus*, *brevipennis*, *tuberculatus*, pl. x, fig. 25, p. 242, *denticulatus*, pl. x, fig. 26, p. 243, Panama, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Cyphaleides.

Prophanes submetallicus, p. 154, *cupreipennis*, p. 155, New Guinea, Maccl., P. Linn. Soc. N.S.W. (2) i, n. spp.

Cnodalonides.

Chremolamus episcopalis, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 74, n. sp.

Cumariodes = (*Tinophyllus*, Fairm.) ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 75. *C. helopioides*, Kl. = (*coquerelli*, Fairm.), and a var. = (*Tinophyllus gracilicornis*, Fairm.) ; *id.*, loc. cit.

Eucyrtus carinatus, Philippines, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 188, n. sp.

Porphyryba raffrayi, Fairm., Ann. Soc. Ent. Fr. (6) iv, p. 235 ; *chalybeata*, *id.* l. c. p. 236, Madagascar, n. spp. ; but *chalybeata* is the same species as *P. raffrayi*, and the latter name should stand ; *id.* l. c. p. 242.

Cyrtosoma denticolle figured, pl. xi, fig. 1. *C. decemlineatum*, Mexico to Panama, pl. xi, fig. 2, p. 244 ; Champ., Biol. Centr. Am. Col. iv (1), n. sp.

Othryoneus, n. g., p. 245, for *O. maculipennis*, Colombia, loc. cit. note, and *erotyloides*, Nicaragua, pl. xi, fig. 3, p. 246, n. spp. ; Champ., Biol. Centr. Am. Col. iv (1).

Camaria parallela, Panama, pl. xl, fig. 4, p. 246, Champ., Biol. Centr. Am. Col. iv (1), n. sp.

Blapida neotropicalis, Guatemala and Nicaragua, pl. xi, fig. 5, p. 247, Champ., Biol. Centr. Am. Col. iv (1), n. sp.

Mophon, n. g., p. 247, for *M. tinclipennis*, Nicaragua and Panama, pl. xi, fig. 6, p. 248, n. sp. ; Champ., Biol. Centr. Am. Col. iv (1).

Epicala, full characters given, p. 249 ; *E. varipes*, Nicaragua, pl. xi, fig. 7, p. 249, *lata*, Mexico, pl. xi, fig. 8, *cupreo-nitens*, Panama, pl. xi, fig. 9, p. 250, n. spp. ; Champ., Biol. Centr. Am. Col. iv (1).

Mæon, n. g. for *M. isthmicus*, *panamensis*, pl. xi, fig. 10, Panama, n. spp. ; Champ., Biol. Centr. Am. Col. iv (1), p. 251.

Acropteron, characters of, discussed, p. 252 ; *A. agriloides*, Mäkl., figured, pl. xi, fig. 13, *A. belti*, Nicaragua, pl. xi, fig. 11, p. 253, *languarioides*, Mäkl., pl. xl, fig. 12, Panama, p. 254, *angulicolle*, Nicaragua, *calcaratum*, pl. xi, fig. 14, p. 255, *longipenne*, pl. xi, fig. 15, Guatemala, *mexicanum*, Mexico, pl. xi, fig. 16, *puncticolle*, Panama, p. 256, *laevipes*, *rugipes*, Nicaragua, p. 257, Champ., Biol. Centr. Am. Col. iv (1), n. spp.

Artystona obscura, p. 411, *collaris*, *obsoleta*, p. 412, N. Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, n. spp.

Ischyomiides.

This is a new group proposed for the aberrant *Ischyomius singularis*, Chev., p. 258 ; full characters given, p. 259 ; the insect figured, pl. xi, fig. 17 ; Champ., Biol. Centr. Am. Col. iv (1).

Apocryphides.

Pseudapocrypha, n. g. for *P. lacordairii*, Mexico and Guatemala, n. sp., pl. xi, fig. 18; Champ., Biol. Centr. Am. Col. iv (1), p. 260.

Helopides.

Adelium hansenii, p. 929, *nigritulum*, p. 930, N. Zealand, Broun, Man. N. Z. Col.; *A. multistriatum*, *simplex*, *sericatum*, p. 409, *intermedium dunedinis*, p. 410, N. Zealand, Sharp, Tr. R. Dublin Soc. (2) iii: n. spp.

Misolampidius, Solsky, characters and position discussed, pp. 204-209, pl. x, figs. 1 & 11-19. *M. morio*, Korea, p. 209, pl. xi, fig. 35; Kolbe, Arch. f. Nat. lii, 1, n. sp.

Mitys, Champ., removed to *Misolampides*, and its characters discussed, *M. politus*, de B. (*levis*, Champ.) p. 261; Champ., Biol. Centr. Am. Col. iv (1).

Suziches, n. g., p. 261, for *S. subcaudatus*, Guatemala, n. sp., pl. xi, fig. 22, p. 262; Champ., Biol. Centr. Am. Col. iv (1).

Ocidates, n. g. for *Spharotus* pt., p. 263, including *O. gravidus*, *mexicanus* and *thoracicus*, de Brême, and *O. planicollis*, Mexico, n. sp., pl. xi, fig. 19, p. 264; Champ., Biol. Centr. Am. Col. iv (1).

Stenomax gracilicollis, Turkestan, Kraatz, Deutsche e. Z. xxx, p. 189, n. sp.

Catomus pilosulus, Turkestan, Kraatz, Deutsche e. Z. xxx, p. 190, n. sp.

Gumarus, n. n. for subg. of *Nalassus*, type *Helops hirtulus*, Reiche; Goz., Recherche, p. 25.

Periatrum, n. g. near *Pseudopairum*, p. 407, for *P. helmsi*, N. Zealand, n. sp., pl. xiii, fig. 5, p. 408; Sharp, Tr. R. Dublin Soc. (2) iii.

Pseudopatrum, n. g., to include *Opatrum tuberculicostatum*, White, and *P. sordidum*, New Zealand, n. sp.; Sharp, Tr. R. Dublin Soc. (2) iii, p. 406.

Chalcodrya, Redt., to be placed in *Helopides*; Sharp, Tr. R. Dublin Soc. (2) iii, p. 413.

Chalcodrya mollis, New Zealand, Broun, Man. N. Z. Col. p. 960, n. sp.

Malacodrya, n. g., aberrant, p. 412, for *M. pictipes*, New Zealand, n. sp., p. 413, pl. xiii, fig. 7; Sharp, Tr. R. Dublin, Soc. (2) iii.

/ *Megacanthides* and *Meracanthides*.

Hoplobrachium, n. g., intermediate between *Megacanthides* and *Meracanthides*, for *H. asperipenne*, pl. ii, fig. 9, Madagascar, n. sp.; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 74.

Amarygmides and *Strongyliides*.

Amarygmus inornatus, p. 155, *oculeus*, *puncticeps*, *convexesculus* (sic), p. 156, N. Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, n. spp.

Dietyus luzonicus, *amplicollis*, Philippines, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 189, n. spp.

Strongylium ingens, Ecuador, Kirsch, B. E. Z. xxx, p. 335, n. sp.

Cerodolus, n. g., near *Isopus*, p. 410, for *C. chrysomeloides*, New Zealand, n. sp., p. 411, pl. xiii, fig. 6; Sharp, Tr. R. Dublin Soc. (2) iii.

Progena illustris, Guinea, Dohrn, S. E. Z. xlvii, p. 316, n. sp.

Cistelides.

Allecula coreana, Korea, Kolb, Arch. f. Nat. lii, 1, p. 211, pl. xi, fig. 36; *A. papuensis*, New Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 156; *A. decorata*, p. 335, *lineata*, p. 336, Colombia, Kirsch, B. E. Z. xxx : n. spp.

Dietopsis sericans, Manilla, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 190, n. sp.

Isomira antennalis, Caspian region, Reitt., Radde Faun. Casp. p. 229, n. sp.

Mycetochares bipustulata, Ill., is ♀, *M. scapularis*, Gyll., ♂ of one species; the larva and pupa described: Will, Ent. Nachr. xii, pp. 264-269.

Homoropsis ustulata, Obock., Fairm., Ann. Soc. Ent. Fr. (6) v, p. 450, n. sp.

Ctenopus and *Sarandonyx*, application of these names discussed; Goz., Recherche, p. 25.

Xystropus nigropictus, Colombia, Kirsch, B. E. Z. xxx, p. 339, n. sp.

MELANDRYIDÆ.

[Cf. Broun (86), Quedenfeldt (570).]

Orchesia, tabulation of European species; Reitt., Wien. ent. Z. v, pp. 348-351.

Orchesia acicularis, Germany, Reitt., Wien. ent. Z. v, p. 349, n. sp.

Ctenoplectron coloratum, p. 960, *dignum*, p. 961, New Zealand, Broun, Man. N. Z. Col. n. spp.

Cteniucantha, n. g., p. 119, for *C. marginata*, n. sp., Porto Rico, p. 121, woodcut; Qued., B. E. Z. xxx.

Phlæotrya vaudoueri, Muls., = (*Dircea fusca*, Lec.); Horn, P. Am. Ent. Soc. xiii, p. xiv.

Eustrophus: to this belong *Eucinetus subaxillaris* and *substriatus*, Fairm.; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 39.

Chalcodrya, cf. *Helopides*.

PYTHIDÆ and PEDILIDÆ.

Pytho (sub *Tenebrio*) *planus*, Ol., = (*americanus*, Kirb.); Horn, Tr. Am. Ent. Soc. xiii, p. 138.

Xylophilus fasciatus and *piceus*, ♂ characters; Schwarz, Ent. Am. ii, p. 139.

Xylophilus nitidifrons, Sweden, Th., Bull. Soc. Ent. Fr. (6) vi, p. x, n. sp.

LAGRIIDÆ.

[Cf. Fairmaire (21, 175, 176), Macleay (411).]

Lagria villosa, F., *basalis*, Hope, *nepalensis*, Hope, discussed; Dohrn, S. E. Z. xlvii, pp. 350-354. *L. pruinosa*, Chev., redescribed; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 190.

Lagria prasinella, Manilla, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 191 ; *L. tristicula*, p. 346, *rubiginea*, *pachycera*, p. 347, China, *odontocera*, Yunnan, p. 348, *janthinipennis*, Tché-Kiang, *chinensis*, China, p. 349, Fairm., Ann. Soc. Ent. Fr. (6) vi ; *L. azureipennis*, *palliat*a, New Guinea, Mael., P. Linn. Soc. N.S.W. (2) i, p. 157 : n. spp.

Nemostira, addendum to generic description ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 75.

Nemostira metallica, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 75, n. sp.

ANTHICIDÆ.

[Cf. Broun (86), Marseul (421), Quedenfeldt (570, 571), Waterhouse (725).]

Anthicus formicoides, Fourc., = (*floralis* auct.) ; Goz., Recherche, p. 26.

Anthicus cyanipennis, Bône, Grilat, Bull. Soc. Ent. Fr. (6) vi, p. clxxxvii ; *A. fulvomicans*, Porto Rico and Mexico, Qued., B. E. Z. xxx, p. 122 ; *A. humeralis*, p. 152, *bisbicinctus*, p. 153, Sumatra, Mars., Notes Leyd. Mus. viii ; *A. minor*, New Zealand, Broun, Man. N. Z. Col. p. 930 : n. spp.

Notoxus, Geoff., = (*Anthicus*, Payk.) ; Goz., Recherche, p. 25.

Liparoderus, Laf., = (*Anthicus* auct. nec Payk) ; Goz., Recherche, p. 25.

Notoxus wissmanni, p. 133, *mülleri*, p. 134, Central Africa, Qued., B. E. Z. xxx ; *N. krugi*, Porto Rico, *id. t. c.* p. 121 : n. spp.

Hypaspistes, n. g., near *Notoxus*, for *H. armatus*, Ceylon, n. sp. ; Wat., Ann. N. H. (5) xvii, p. 39, woodcut.

MORDELLIDÆ, RHIPIDOPHORIDÆ, and STYLOPIDÆ.

[Cf. Quedenfeldt (570).]

Mordella ferruginea, F., referred to *Mordellistena* ; Qued., B. E. Z. xxx, p. 127.

Mordella leucocephala, p. 124, *basifulva*, p. 125, Porto Rico, Qued., B. E. Z. xxx, n. spp.

Mordellistena signaticollis, p. 125, *annuliventris*, p. 126, Qued., B. E. Z. xxx, n. spp.

Rhipiphorus paradoxus, L., mode of procuring it from wasps' nests ; Delaby, Bull. Soc. L. N. Fr. vii, pp. 198-201. *R. sordidus* n. var. *major*, Porto Rico ; Qued., B. E. Z. xxx, p. 128.

Myodites subdipterus parasitic on *Halictus sexcinctus*, larvæ probably dimorphic ; Fabre, Souvenirs, iii, pp. 220, &c.

Stylops, the attacks of on *Andrena* ; Pérez (527).

CANTHARIDÆ.

[Cf. Beauregard (37), Fairmaire (174, 176), Heyden (288), Kirsch (354), Kolbe (362).]

Note pour servir à la classification des Meloïdes du Mexique par E. Dugès ; Bull. Soc. Z. Fr. xi, pp. 578-582. A synoptic table of the genera found in Mexico, and a list of the species in the writer's collection.

Beauregard's memoir (37) on *Cantharidae* is largely devoted to particulars of the skeleton and trophi : the insects chiefly alluded to are *Cantharis vesicatoria*, *Epicauta verticalis*, *Lytta fabricii*, *pennsylvanica*, *Cerocomia schreberi*, *Mylabris 4-punctata*, *geminata*, *Zonitis mutica*, *Meloe angusticollis*, *proscarabeus*, *majalis*, and *Sitaris humeralis*.

Beauregard note sur quelques particularités du développement de la *Cantharide* ; C.R. Ass. Fr. Sci. xiv, 2, pp. 455-457. (Scientific name not given.)

Structure des élytrés et des ailes des Vésicants ; Beauregard, C.R. Soc. Biol. (8) ii, pp. 241-246.

Note sur le mode de développement naturel de la Cantharide ; Beauregard, C.R. Soc. Biol. (8) ii, pp. 383 & 384. (Relates to metamorphosis of *Lytta*.)

Ensayo para la Monografia de los Coleopteros *Meloidos* indigenas con aplicacion a las ciencias medicas por R. J. Gorriz y Muñoz. Saragossa : 1882, pp. 190, pls. i & ii. (This contains two or three new species and varieties, but appears to have previously escaped notice in Zool. Rec. It contains full descriptions in the Spanish language of the generic and specific characters. Previous works by this writer have been recorded under the name of Muñoz, but it should be Gorriz.)

Meloe, tarsal suckers of ; Pero, Boll. Mus. Tor. i, No. 13. *Meloe* larvæ found in great numbers on a specimen of *Amphicoma lasserei* ; Reitt., Wien. ent. Z. v, p. 99. *M. proscarabeus*, habits of larvæ ; P. E. Soc. 1886, p. xxx. *M. lobata*, Gebl., note on ; Kolbe, Arch. f. Nat. lii, 1, p. 212.

Meloe fissicornis (? *laevigata* var.), Gorriz, Mon. Col. Mel. p. 38, n. sp.

Cerocomia schæfferi, metamorphoses, pp. 253, &c., pseudo-chrysalis, fig. 7, p. 255, secondary larva, fig. 8, p. 257 ; Fabre, Souvenirs, iii.

Mylabris melanura, larva described ; Becker, Bull. Mosc. xl. p. 171. *M. 12 punctata*, metamorphoses, p. 274, &c., primary larva, fig. 9, p. 275 ; Fabre, Souvenirs, iii. *M. oleæ* in medicine ; Bonnet (63).

Mylabris lichtensteni, Spain, Gorriz, Mon. Col. Mel. p. 124 ; *M. (Ceroctes) aurantiaca*, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 450 : n. spp.

Eletica coarctata, Tanganyika, p. 298, *laeviceps*, Congo, p. 299, *pubicollis*, Stanley Pool, p. 300, Kolbe, Ent. Nachr. xii, n. spp.

Eletica colorata, Har., note on sexes of ; Kolbe, Ent. Nachr. xii, p. 301.

Epicauta verticalis, note on the development of ; Beauregard, C.R. Soc. Biol. (8) ii, p. 624.

Lydus (Halosimus) marginicollis (Deyr.), Asia Minor, Heyd., Deutsche e. Z. xxx, p. 279, n. sp.

Hapalus davidis, Tché-Kiang, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 352, n. sp.

Lytta vesicatoria, habits ; Fabre, Souvenirs, iii, p. 269 : var. n. *armeniaca*, Elisabethpol ; Reitt., Wien. ent. Z. v, p. 99.

Cantharis nigronotata, Haag. = ? (*Epicauta fusciceps*, Walk.) ; Fairm., Ann. Soc. Ent. Fr. (6) v, p. 451.

Cantharis malatiensis, Asia Minor ; Heyd., Deutsche e. Z. xxx, p. 279 ; *C. picitarsis*, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 451 ; *C. fissi-*

collis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 350; *L. bimaculosa*, Colombia, Kirsch., B. E. Z. xxx, p. 336 : n. spp.

Zonitis præusta, métamorphoses; Fabre, Souvenirs, iii, p. 279.

Zonitis fuscimembris, Yunnan, *dauidis*, Pekin, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 351, n. spp.

CEDEMERIDÆ.

[Cf. Broun (86), Fairmaire (174, 176), Heyden (286, 287), Kirsch (354), Macleay (411).]

Ananca spurcaticollis, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 452; *A. grandis*, *humeralis*, p. 337, *bipunctata alticola*, p. 338, Colombia, *costulata*, Ecuador, p. 33, Kirsch, B. E. Z. xxx : n. spp.

Thelyphassa limbata, N. Zealand, Broun, Man. N. Z. Col., p. 961, n. sp.

Nacerdes rufipes, N. Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 157, n. sp.

Chrysanthia integricollis, Suyfun River, Heyd., Deutsche e. Z. xxx, p. 275, n. sp.

Peronocnemis, n. g. near *Anoncodes*, for *P. dauidis*, Mou-Pin, n. sp.; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 352.

Sparedropsis, n. g. near *Sparedrus* for *S. fuscus*, Turkestan, n. sp.; Heyd., Deutsche e. Z. xxx, p. 191.

Colobostomus, n. g. near *Probosca*, p. 452, for *C. griseo-vestitus*, Obock, n. sp., p. 423; Fairm., Ann. Soc. Ent. Fr. (6) v.

CURCULIONIDÆ.

[Cf. Aurivillius (16), Bedel (40), Broun (86), Casey (118), Costa (132), Dugès (156), Fairmaire (174, 175, 176), Faust (178, 179, 180, 181, 182, 183, 184, 185, 186), Gadeau de Kerville (223, 224), Heyden (286), Kolbe (359), Macleay (411), Pascoe (521, 522, 524), Petri (550), Reitter (573), Sharp (655), Stierlin (687, 688), Waterhouse (726, 727).]

Bargagli continues his compilation of observations [cf. Zool. Rec. xxii, Titles (17)] on the habits and food plants of European *Rhyncophora* in Bull. Soc. Ent. Ital. 1886, pp. 3-23, 259-307. A complete list of the food plants, arranged botanically, is given, and a very well-designed systematic list of the insects and their relations in their different stages to plants is commenced:

Brachyderides, *Otiorhynchides*, *Eremnides*, *Leptopsides*.

Classification, Faust (180).

Form of the epimera as a means of classification in this group discredited; Goz., Recherche, p. 29.

Blosyrus depressus, N.W. India, Faust, S. E. Z. xlvii, p. 129, n. sp.

Dactylotus characters of, *Blosyrus* ? *globosus*, Motsch., *trivialis*, Faust referred to it, p. 250.

Dactylotus semipubens, p. 250, *egenus*, p. 252, *roborovskiyi*, p. 253, Central Asia, n. spp.; Faust, Hor. Ent. Ross. xx.

Cnecorhinus paulinoi, Portugal, Stierl., MT. schw. ent. Ges. vii, p. 286, n. sp.

Cutoptes, Boh., characters amended, to include *Irenimus*, Pascoe ; Sharp, Tr. R. Dublin Soc. (2) iii, p. 422.

Cutoptes brevicornis, p. 422, *scutellaris*, p. 423, *longulus*, p. 424, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, n. spp.

Cutapionus dochturovi, Central Asia, Faust, Hor. Ent. Ross. xx, p. 157, n. sp.

Liophlæus: the species found in France discussed by des Gozis, Recherche, pp. 26-28, and Rev. d'Ent. v, pp. 222-230.

Sciaphilus syriacus, Syria, Stierl., MT. schw. ent. Ges. vii, p. 228, n. sp.

Brachyderes, *Strophomorphus*, *Epiphaneus*, *Pholicodes*, differentiated ; Faust, S. E. Z. xlvii, p. 36.

Brachyderes paulinoi, Portugal, Stierl., MT. schw. ent. Ges. vii, p. 285, n. sp.

Athetetes, n. g., p. 415, near *Naupactus*, for *A. globicollis*, Mexico, n. sp., p. 416 ; Pascoe, Ann. N. H. (5) xvii.

Sitones caucasicus, Caucasus, p. 227, *reitteri*, Morea, *maroccanus*, Morocco, p. 228, Stierl., MT. schw. ent. Ges. vii, n. spp.

Stasioidis, n. g., for part of *Polydrusus* auct., type *viridis*, Boh. ; Goz., Recherche, p. 29.

Auchmeresthes and *Metacinops*, note on position of ; Faust, B. E. Z. xxx, p. 98.

Thylacites noxius, p. 130, *nubifer*, p. 131, Kashgar, Faust, S. E. Z. xlvii, n. spp.

Xylinophorus, n. g. near *Thylacites*, for *T. scobinatus*, Kol., and *vernicularis* and *prodromus*, Faust ; Faust, Hor. Ent. Ross. xx, p. 158.

Ottistira fasciata, New Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 184, n. sp.

Piazomias griseistrius, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 217 ; *P. peregrinus*, p. 319, *macer*, p. 320, Delagoa Bay, Pasc., J. L. S. xix : n. spp.

Leptomias, n. g., p. 132, near *Orthomias*, type *Pachynotus angustulus*, Redt. ; *L. bimaculatus*, p. 132, *audax*, p. 134, *jekeli*, p. 135, N.W. India, *invidus*, p. 136, *stoliczkæ*, p. 137, *verrucicollis*, p. 138, Faust, S. E. Z. xlvii ; *L. errans*, Central Asia, Faust, Hor. Ent. Ross. xx, p. 158 : n. spp.

Ischnotrachelus, *Astycus*, *Astycomerus*, and *Brachyaspistes* commented on, and their distinctness queried ; Faust, Deutsche e. Z. xxx, p. 352, note.

Ischnotrachelus viridisparvus, p. 346, *crux*, p. 347, *plicatus*, p. 348, Gaboon, *solitus*, p. 349, Stanley Pool, *humeralis*, p. 350, Gaboon, *nanus*, p. 351, Stanley Pool, *argentatus*, p. 351, Old Calabar, Faust, Deutsche e. Z. xxx, n. spp.

Astycomerus variegatus, Gaboon, p. 352, *tuberculifer*, Leshumo-Thal, p. 354, Faust, Deutsche e. Z. xxx, n. spp.

Cimbus phasianellus, *limbalis*, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 453, n. spp.

Eutinopus, n. g. *Tanymecinatorum*, p. 254, for *E. letus*, p. 256, *tonsus*, p. 258, Central Asia, *opalescens*, Pamir, *occultus*, Wernoje, p. 256, *procerus*, Persia, p. 257, n. spp., to include also *Thylacites glaucus*, *mongolicus*, Faust, Faust, Hor. Ent. Ross. xx.

Homæotrachelus, n. g. *Tanymecinatorum*, p. 360, for *H. australasiæ*,

Gawler Mountains, p. 360, *subsulcatus*, Australia, p. 361, n. spp., Faust, Deutsche e. Z. xxx.

Xenorhinus, n. g. *Tanymecinorum*, p. 355, for *X. auriculatus*, p. 356, *incultus*, p. 357, Caffraria, n. spp. ; Faust, Deutsche e. Z. xxx.

Hadronotus, n. g., *Tanymecinorum*, p. 342, for *H. viridulus*, Darjeeling, n. sp., p. 343, and to include *Siderodactylus adstringatus*, Gyll. ; Faust, Deutsche e. Z. xxx.

Iphisomus, n. g. *Tanymecinorum*, for *Siderodactylus falciger*, Gerst. ; Faust, Deutsche e. Z. xxx, p. 342, note.

Heteroscapus, n. g. *Tanymecinorum*, p. 343, for *H. acuticollis*, Gaboon, p. 344, *virescens*, Stanley Pool, p. 345, n. spp. ; Faust, Deutsche e. Z. xxx.

Leptoscapus, Chev., previously insufficiently characterized, full characters for, and *Siderodactylus*, Th., referred to it ; Faust, Deutsche e. Z. xxx, p. 344.

Polycleis suturatus, Fairm., varieties noticed ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 76.

Siderodactylus oberthurii, Congo, *delectans*, p. 320, *puellaris*, Old Calabar, p. 321, Pasc., J. L. S. xix, n. spp.

Chlorophanus notabilis, p. 159, *ferghanensis*, p. 160, *disjunctus*, p. 162, *viduus*, p. 163, *magnificus*, p. 164, Central Asia, Faust, Hor. Ent. Ross. xx, n. spp.

Stigmatrachelus vittatus, p. 322, *ruptus*, p. 323, *flexuosus*, p. 324, Madagascar, *longiceps*, Mamboia, p. 323, Pasc., J. L. S. xix ; *S. intermedius*, p. 337, *insubidus*, p. 338, Madagascar, Faust, Deutsche e. Z. xxx : n. spp.

Dermatodes metallescens, Mamboia, Pasc., J. L. S. xix, p. 321, n. sp.

Pamphca, n. g. near *Dermatodes*, for *P. deficiens*, n. sp., Comoro Is. ; Pasc., J. L. S. xix, p. 322.

Ischnomias opulentus, Gaboon, Faust, Deutsche e. Z. xxx, p. 340, n. sp.

Epilaris venusta, Gaboon, Faust, Deutsche e. Z. xxx, p. 341, n. sp.

Melactus, n. g., for *Cyphus bispinus* and *lugubris* ; Pasc., Ann. N. H. (5) xvii, p. 416.

Eustales nævius, Rio Janeiro, Pasc., C.R. ent. Belg. 1886, p. cliii, n. sp.

Epicærus imbricatus, process of losing the mandibular appendages ; Schwarz, P. E. Soc. Wash. i, p. 29.

Prypnides, Lac., the group not sufficiently distinct from *Tanymecides* ; Faust, Deutsche e. Z. xxx, p. 362.

Prypnus ? *pygmaeus*, Australia, Faust, Deutsche e. Z. xxx, p. 362, n. sp.

Apocyrtus froggatti, N. Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 183, n. sp.

Coptorrhynchus speculatus, *bombicollis*, *nudus*, N. Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 185, n. spp.

Brachyrrhinus and *Otiorrhynchus*, use of these names discussed ; Goz, Recherche, p. 29.

Otiorrhynchus ; *Timolphis*, Goz., discussed ; Stierl., MT. schw. ent. Ges. vii, p. 230. *O. strumosus*, Hell., note on ; Wien. ent. Z. v, p. 253. *O. populeti*, Boh., destroying vines ; Wény, Rov. Lapok, iii, pp. 3-9 & ii. *O. meridionalis* var. *peyrissaci*, Bordeaux, p. 282 ; *O. grouvellei*, *lanuginosus*,

and *selle* discussed. pp. 283 & 284: Stierl., MT. schw. ent. Ges. vii. *O. prostratus*, n. n. for *O. tenuis*, Stierl. (Deutsche e. Z. 1885, p. 294); Heyd., Deutsche e. Z. xxx, p. 280.

Otiorhynchus simplonicus, Switzerland, p. 226, *O. (Tournieria) conici-rostris*, Caucasus, *O. (Aramnichnus) hispidus*, Mongolia, p. 227, Stierl., MT. schw. ent. Ges. vii; *O. paulinoi*, Portugal, *præcellens*, S. E. Europe, p. 282, *planidorsis*, France, *styriacus*, Styria, p. 283, *id. t. c.*; *O. (Tournieria) amœnus*, Kashgar, Faust, S. E. Z. xlvii, p. 139; *O. (Tournieria) alaianus*, Turkestan, Stierl., Deutsche e. Z. xxx, p. 191; *Brachyrrhinus oberti*, p. 153, *irritabilis*, p. 154, *B. (Tournieria) astutus*, p. 155, Central Asia, Faust, Hor. Ent. Ross. xx: n. spp.

Catamonus suffusus, Old Calabar, Pasc., J. L. S. xix, p. 324, n. sp.

Stiamus, n. g., near *Brachyderes*, for *S. brachyurus*, n. sp., Comoro islands, pl. xli, fig. 6; Pasc., J. L. S. xix, p. 325.

Ectitheis, n. g., near *Sciobius*, p. 325, for *E. divisus*, n. sp., Natal, pl. xli, fig. 3, p. 326; Pasc., J. L. S. xix.

Systates laticollis, Congo, Pasc., J. L. S. xix, p. 327, n. sp.

Brachycyrtus, n. g., near *Catalalus*, p. 76, for *B. setofasciatus*, p. 77, pl. ii, fig. 10, Madagascar, n. sp., Fairm., Ann. Soc. Ent. Fr. (6) vi.

Platymicus aridus, Mamboia, p. 326, pl. xli, fig. 5, Pasc., J. L. S. xix, n. sp.

Straticus, n. g., near *Laparocerns*, p. 326, for *S. funestus*, n. sp., Mamboia, p. 327; Pasc., J. L. S. xix.

Cyclomaurus, revised tabulation of this and allied genera; Faust, B. E. Z. xxx, p. 97.

Cyclobarus, n. g., type *Cyclomaurus cyrtus*, Fairm.; Faust, B. E. Z. xxx, p. 97.

Omius viertli, Germany, Weise, Deutsche e. Z. xxx, p. 426, n. sp.

Ptochus percussus, p. 140, *afflictus*, p. 141, N. W. India, Faust, S. E. Z. xlvii; *P. subcretaceus*, Central Asia, Faust, Hor. Ent. Ross. xx, p. 156: n. spp.

Trachyphleus cecyropioides, p. 905, *rugosus*, p. 930, N. Zealand, Broun, Man. N. Z. Col., n. spp.

Otiorhynchini: the New Zealand genera of, tabulated and described; Sharp, Tr. R. Dublin Soc. (2) iii, pp. 415-426.

Cecyropa, Pasc., recharacterized; Sharp, Tr. R. Dublin Soc. (2) iii, p. 416.

Cecyropa setigera, p. 905, *macularia*, p. 961, N. Zealand, Broun, Man. N. Z. Col.; *albicans*, N. Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 416: n. spp.

Platymida, White, = (*Empæotes*, Pasc., = *Eurynotia*, Broun); Sharp, Tr. R. Dublin Soc. (2) iii.

Platymida (sub *Ancistropterus*) *hochstetteri*, Redt., = (*Eurynotia pulcherrima*, Broun); Sharp, Tr. R. Dublin Soc. (2) iii, p. 415.

Platymida coronata, p. 420, pl. xiii, fig. 12, *simulatrix*, p. 421, N. Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, n. spp.

Protophormus, n. g., near *Phyllobius*, p. 416, for *P. gracilis*, p. 417, pl. xiii, fig. 9, *P. binodulus*, *robustus*, p. 418, N. Zealand, n. spp., and *Catoptes robustus*, Broun; Sharp, Tr. R. Dublin Soc. (2) iii.

Nonnotus, n. g., near *Protophormus*, p. 418, for *N. griseolus*, N. Zealand, n. sp., p. 419, pl. xiii, fig. 8; Sharp, Tr. R. Dublin Soc. (2) iii.

Epitimetes, Pasc., recharacterized; Sharp, Tr. R. Dublin Soc. (2) iii, p. 419.

Aporolobus, n. g., for *Trachyphlaeus irritus*, Pasc.; Sharp, Tr. R. Dublin Soc. (2) iii, p. 421: the insect figured; *id. t. c.* pl. xiii, fig. 10.

Protolobus, n. g., near *Aporolobus*, for *P. obscurus*, N. Zealand, n. sp.; Sharp, Tr. R. Dublin Soc. (2) iii, p. 422: ? to include also *Trachyphlaeus parvulus*, Pasc.; *id. loc. cit.*

Heterodiscus, n. g., near *Megalometis*, p. 426, for *H. insolitus*, pl. xiii, fig. 13, *horridus*, p. 427, N. Zealand, n. spp.; Sharp, Tr. R. Dublin Soc. (2) iii.

Geochus rugulosus, N. Zealand, Broun, Man. N. Z. Col. p. 931, n. sp.

Niccana cinerea, N. Zealand, Broun, Man. N. Z. Col. p. 931, n. sp.

Inophlaeus sulcifer, p. 905, *costifer*, p. 932, *egregius*, p. 962, N. Zealand, Broun, Man. N. Z. Col., n. spp.

Empicotes æquus, N. Zealand, Broun, Man. N. Z. Col. p. 932, n. sp.

Phlicodes lateralis, Tiflis, p. 37, *glaucinus*, Armenia, p. 38, Faust, S. E. Z. xlvii, n. spp.

Epiphaneus dohrni, Kurdistan, Faust, S. E. Z. xlvii, p. 36, n. sp.

Brachymerinthus, n. g., *Eustylinorum*, p. 338, for *B. helferi*, Mesopotamia, n. sp., p. 339; Faust, Deutsche e. Z. xxx.

Phyllobius alneti and *calcaratus*, F., distinctions discussed: *alneti*, n. var. *densatus*; Schilsky, Deutsche e. Z. xxx, pp. 94-96.

Phyllobius hungaricus, Hungary, Stierl., MT. schw. ent. Ges. vii, p. 284, n. sp.

Corigetus exaptus, N.W. India, Faust, S. E. Z. xlvii, p. 143; *C. semenovi*, Central Asia, Faust, Hor. Ent. Ross. xx, n. spp.

Arhines brunneus, N.W. India, Faust, S. E. Z. xlvii, p. 142, n. sp.

Platytrachelus propinquus, N.W. India, Faust, S. E. Z. xlvii, p. 147; *P. pubes*, Calcutta, Faust, Deutsche e. Z. xxx, p. 357: n. spp.

Synolobus, n. g., p. 144 (*Erenninae*), for *S. periteloides*, p. 145, *distans*, p. 146, n. spp., Kashgar; Faust, S. E. Z. xlvii.

Heteroptochus, n. g., near *Synolobus*, for *H. pascoei*, N.W. India, n. sp.; Faust, S. E. Z. xlvii, p. 146.

Heteroptochus ornatus, Queensland, p. 358, *nickerli*, Tenasserim, p. 359, *H. ? devians*, Darjeeling, p. 363, Faust, Deutsche e. Z. xxx, n. spp.

Chloëbius, tabulation of specific characters of; Faust, Hor. Ent. Ross. xx, p. 143.

Entyus dolosus, Rio Janeiro, Pasc., C.R. ent. Belg. 1886, p. cliv, n. sp.

Miostictus, n. g., near *Entyus*, for *M. volzemi*, Rio Janeiro, n. sp.; Pasc., C.R. ent. Belg. 1886, p. cliv.

Brachyleptops, n. g., near *Strangaliodes*, for *B. murex*, Madagascar, n. sp.; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 77.

Dysphiles, n. g., p. 416, near *Bastactes*, for *D. ferrugatus*, Brazil, n. sp., p. 417; Pasc., Ann. N. H. (5) xvii.

Dicasticus, n. g., p. 327, for *D. quadridens*, pl. xli, fig. 2, *laticollis*, p. 328, *celatus*, p. 329, Mambouia, n. spp.; Pasc., J. L. S. xix.

Ostra, n. g., near *Leptops*, for *O. nodulosa*, Madagascar, n. sp.: Pasc., J. L. S. xix, p. 329.

Byrsopsides.

Gronops oberi, Central Asia, Faust, Hor. Ent. Ross. xx, p. 165, n. sp.

Hipporhinides.

Brachyolus, White, characters noticed, position to be in *Oliorhynchides*; Sharp, Tr. R. Dublin Soc. (2) iii, p. 424.

Brachyolus inequalis, p. 424, *punctipennis*, *bagoooides*, p. 425, *huttoni*, pl. xiii, fig. 11, *longicollis*, p. 426, N. Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, n. spp.

Rhyparosomides, Cyldrorrhinides, Lithinides.

Styphlus ulcerosus, Aubé., is a *Cotaster*; Reitt., Wien. ent. Z. v, p. 99.

Erymneus longulus, p. 931, *cænosus*, p. 932, New Zealand, Broun, Man. N. Z. Col., n. sp.

Cuneopterus, n. g., near *Phrynixus*, Pasc., for *C. conicus*, New Zealand, n. sp., pl. xiii, fig. 14; Sharp, Tr. R. Dublin Soc. (2) iii, p. 428.

Dermotrichus, n. g., near *Phrynixus*, for *D. mundulus*, New Zealand, n. sp., pl. xiii, fig. 15; Sharp, Tr. R. Dublin Soc. (2) iii.

Philernus and *Pseudostyphlus* discussed; Faust, S. E. Z. xlvii, p. 23.

Orthochates, the characters of, and allied genera, discussed and tabulated; Faust, S. E. Z. xlvii, pp. 24–251.

Cotaster, to this belongs *Styphlus ulcerosus*, Aubé; Reitt., Wien. ent. Z. v, p. 99.

Rhytiphlæus nigroperlatus, Fairm., redescribed; Ann. Soc. Ent. Fr. (6) vi, p. 78.

Molytides.

Liparus seriatopunctatus, Turkestan, Heyd., Deutsche e. Z. xxx, p. 192, n. sp.

Microcopes, n. g., type *Styphlus uncatus*, Friv.; Faust., S. E. Z. xlvii, p. 31.

Plinthus and allied genera tabulated; Faust, S. E. Z. xlvii, p. 26.

Caulomorphus, n. g., type *Styphlus lederi*, Chevr.; Faust, S. E. Z. xlvii, p. 28.

Anchonidium, n. g., type *Styphlus unguicularis*, Aubé; Bed., Faune Col. Seine, vi, p. 92.

Anchonidium perplexum, *corticeum*, Caucasus, Faust, S. E. Z. xlvii, p. 32, n. spp.

Heteronyx, n. g., p. 172, for *H. ferus*, Pamir, n. sp., p. 173; Faust, Hor. Ent. Ross. xx.

Cryptocerus, n. g., p. 261, for *C. przewalskyi*, Central Asia, n. sp., p. 262; Faust, Hor. Ent. Ross. xx.

Tanyrhynchides and Promecopides.

Tanyrhynchides: tabulation of genera and remarks on the characters of the group; Faust, B. E. Z. xxx, pp. 99 & 100.

Aosselerus jekeli, Trop. Africa, Faust, B. E. Z. xxx, p. 101, n. sp.

Tanyrhynchus ellipticus, Natal, Pasc., J. L. S. xix, p. 330, n. sp.

Promecops lineigera, Rio Janeiro, Pasc., C.R. ent. Belg. 1886, p. clv, n. sp.

Hyperides.

Alophus caudiculatus, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 353; *A. plausibilis*, Central Asia, Faust, Hor. Ent. Ross. xx, p. 166; *A. marginatus*, Central Asia, *id. t. c.* p. 263 : n. spp.

Hypera arundinis, Payk., and *H. adspersa*, Fab., metamorphoses; Gadeau de Kerville, Ann. Soc. Ent. Fr. (6) vi, p. 357. *Phytonomus murinus* and *variabilis*, *P. elongatus* and *suspiciosus*, distinctions of; Th., Bull. Soc. Ent. Fr. (6) vi, p. xi.

Hypera imbecilla, N.W. India, Faust, S. E. Z. xlvii, p. 150; *Phytonomus* (*Donus*) *karamani*, Dalmatia, Stierl., MT. schw. ent. Ges. vii, p. 229 : n. spp.

Ita, Tourn., referred to *Hyperides*, not *Tanyrhynchides*; Faust, B. E. Z. xxx, p. 101.

Cleonides.

Pachycerus (*Rhabdorhynchus*) *grummi*, Central Asia, Faust, Hor. Ent. Ross. xx, p. 167, n. sp.

Bothynoderes, Sch., = (*Chromoderus*, Motsch.); Goz., Recherche, p. 30. *Asproparthenis*, n. n. for *Bothynoderes*, Motsch.; Goz., Recherche, p. 30. *Bothynoderes libitinaris*, Kashgar, Faust, S. E. Z. xlvii, p. 148, n. sp.

Cleonus albidus, Fab., habits and parasite; Marchal, Mem. Soc. Saône, vi, pp. 74-79 : habits; Feuille. Nat. xv, pp. 81 & 98. *C. betavorus*, ravages in Russia; Bourg., Bull. Soc. Ent. Fr. (6) vi, pp. clxxii-clxxiv. *C.* (*Liocleonus*) *virgo*, Chev., = ? (*C. venustus*, Walk.); Fairm., Ann. Soc. Ent. Fr. (6) v, p. 464.

Cleonus (*Plagiographus*) *montalbicus*, Sardinia, Costa, Rend. Acc. Nap. xxv, p. 52, n. sp.

Stephanocleonus przewalskyi, Central Asia, Faust, Hor. Ent. Ross. xx, p. 265, n. sp.

Larinus wilkinsi, Central Asia, Faust, Hor. Ent. Ross. xx, p. 171, n. sp. *Lixus probus*, p. 168, *causticus*, p. 169, Central Asia, *schach*, Persia, p. 170, Faust, Hor. Ent. Ross. xx, n. spp.

Hylobiides.

Dryopais, n. g. (contrasted with *Hylobius*), for *D. variabilis*, n. sp.; Broun, Man. N. Z. Col. p. 933.

Eiratus ornatus, p. 906, *suavis*, p. 934, N. Zealand, Broun, Man. N. Z. Col., n. spp.

Lyperobius cupiendus, N. Zealand, Broun, Man. N. Z. Col. p. 962, n. sp.

Pissodes strobi, Peck, its injuries to trees; Riley, Rep. 1885, pp. 322-325, pl. ix.

Erirhinides.

Thecorhinus, n. g., p. 175, near *Procas*, for *T. modestus*, Turkestan, n. sp., p. 176; Faust, Hor. Ent. Ross. xx.

Ætiomerus, n. g., for *Æ. nodosus*, Peru, n. sp.; Pasc., Ann. N. H. (5) xvii, p. 417.

Thryogenes, n. g., for part of *Erirhinus*, auct.; Bedel, Faune Col. Seine vi (1884), p. 108.

Erirhinus cheesemani, p. 963, *difformipes*, p. 964, *nesobius*, p. 965, N. Zealand, Broun, Man. N. Z. Col., n. spp.

Simachus, n. g., near *Erirhinus*, for *S. montanus*, n. sp., N. Zealand ; Broun, Man. N. Z. Col. p. 963.

Eteophilus, n. n. to replace *Dorytomus*, auct. ; Bed., Faune Col. Seine, vi, 2, p. 280.

Dorytomus aciphyllæ, N. Zealand, Broun, Man. N. Z. Col. p. 965, n. sp.

Cyttalia dispar, N. Zealand, Broun, Man. N. Z. Col. p. 907, n. sp.

Praolepra fultoni, N. Zealand, Broun, Man. N. Z. Col. p. 908, n. sp.

Aneuma compta, N. Zealand, Broun, Man. N. Z. Col. p. 934, n. sp.

Oreocharis bicristata, N. Zealand, Broun, Man. N. Z. Col. p. 907, n. sp.

Eugnomus monachus, N. Zealand, Broun, Man. N. Z. Col. p. 966, n. sp.

Aubeonymus, *Pachytychius*, and *Hypoglyptus* discussed ; Faust, S. E. Z. xlvii, p. 23.

Smicronyx tartaricus, Turkestan, Faust, Hor. Ent. Ross. xx, p. 174, n. sp.

Smicronyx griseus and *tychioides*, Lec., note on ; Hamilton, Canad. Ent. xviii, p. 114.

Amalactides.

Tranes internatus, Pasc., larva described and figured ; Westwood, Ann. Ent. Belg. xxx, pp. 128 & 129, pl. v, figs. A & 1-14.

Belides and Apionides.

Homalocerus punctum, Parana, Pasc., Ann. N. H. (5) xvii, p. 418, n. sp.

Apion varipes, *bohemani*, *apricans*, synonymy of ; Wien. ent. Z. v, p. 254. *A. variegatum*, Wenck., and *bicolor*, Gredl., noticed ; Bed., Bull. Soc. Ent. Fr. (6) vi, p. lxxvii & lxxxiii. *A. assimile*, ♂ distinction ; Th., Bull. Soc. Ent. Fr. (6) vi, p. xi. *A. dichroum*, n. n. for *flavipes*, Payk. (nec Fab.) ; Bed., Faune Col. Seine, vi, 2, p. 209.

Apion defensum, Central Asia, Faust, Hor. Ent. Ross. xx, p. 177 ; *A. celeste*, N.W. India, *id.* S. E. Z. xlvii, p. 151 : n. spp.

Attelabides, Rhinomacerides.

Euops cupreosplendens, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 186, n. sp.

Apoderus angulipennis, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 215, pl. xi, fig. 37, n. sp.

Attelabus atricornis var. *obsidianus*, Costa, Rend. Acc. Nap. xxv, p. 52.

Attelabus chrysideus, Delagoa Bay, Pasc., J. L. S. xix, p. 330, n. sp.

Rhynchites rugosus, Gebl., n. var. *diversicolor*, Korea ; Kolbe, Arch. f. Nat. lii, 1, p. 217.

Rhynchites solutus, N.W. India, Faust, S. E. Z. xlvii, p. 152, n. sp.

Diodyrhynchus karamani, Dalmatia, Stierl., MT. schw. ent. Ges. vii, p. 229, n. sp.

Scolopterides.

Scolopterus abnormis, New Zealand, Broun, Man. N. Z. Col. p. 908, n. sp.

Ancistropterus hochstetteri, Redt., cf. *Platyomida*, *Otiorhynchides*. *A. prasinus*, Broun, figured; Waterh., Aid, pl. 171, fig. 5.

Ancistropterus helmsi, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 452, n. sp.

Stephanorhynchus aper, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 429, n. sp.

Magdalinides, *Balaninides*, *Anthonomides*.

Curculio, L., = (*Magdalis*, Germ.) ; Goz., Recherche, p. 30.

Magdalis pipitzi, p. 364, *bicristata*, p. 365, Rio Grande do Sul, Faust, Deutsche e. Z. xxx, n. spp.

Balaninus (sub *Rhynchenus*) *proboscideus*, F., = (*caryatrypes*, Boh.) ; Horn, Tr. Am. Ent. Soc. xiii, p. 140.

Balaninus brevirostris, Congo, Pasc., J. L. S. xix, p. 331, n. sp.

Timola, n. g. near *Balaninus*, p. 331, for *T. suturalis*, Grahamstown, n. sp., p. 332 ; Pasc., J. L. S. xix.

Lonchophorus obliquus, note on ; *Jornal do agricultor. Ann. 7, T 14, pp. 172 & 173.

Anthonomus musculus, Say, variations, ravages, habits, description, &c. ; Riley, Rep. 1885, pp. 276-282, pl. vii, figs. 6 & 7.

Bradybatus carbonarius, Lenkoran, Reitt., Radde Faun. Casp. p. 230, n. sp.

Tychiides and *Cionides*.

Elescus salicis, Siebenburg, Petri, Verh. siebenb. Ver. xxxvi, p. 73, n. sp.

Tychius sericatus, Tourn., Ann. Soc. Fr. 1874, p. 488, = (*sericans*, Goz.) ; *T. junior*, n. n. for *T. sericulus*, Tourn., t. c. p. 498 ; Goz., Recherche, p. 31.

Sibinia recreata, n. n. for *S. curtirostris*, Tourn. ; Goz., Recherche, p. 31.

Sibinia taschkentica, Central Asia, Faust, Hor. Ent. Ross. xx, p. 177, n. sp.

Cionus dependens, N.W. India, Faust, S. E. Z. xlvii, p. 153, n. sp.

Læmosaccides, *Alcidides*, *Nerthopides*.

Læmosaccus, position to be in *Magdalinæ* ; Paso., Ann. N. H. (5) xvii, p. 419.

Læmosaccus blandus, p. 418, *rufescens*, Parana, *ebenus*, St. Catherine's, p. 419, Pasc., Ann. N. H. (5) xvii, n. spp.

Alcides granicollis, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 79, n. sp.

Pristimerus opiparis, Rio Grande do Sul, Faust, Deutsche e. Z. xxx, p. 366, n. sp.

Menemachides, *Cholides*.

Acicnemis ornata, p. 187, *lobicollis*, p. 188, New Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 188, n. spp.

Cholus oberthurii, Up. Amazons, *megaspilus*, Peru, *canescens*, Panama, Pasc., Ann. N. H. (5) xvii, p. 420, n. spp.

Erethistes amplicollis, S. Paulo d'Olivencia, Pasc., Ann. N. H. (5) xvii, n. sp.

Cryptorhynchides.

Elytrocoptus prolifer, Ecuador, Pasc., Ann. N. H. (5) xvii, p. 421, n. sp.

Cyphorhynchus diurus, Peru, *crassus*, Brazil, Pasc., Ann. N. H. (5) xvii, p. 422, n. sp.

Desmidophorus satanas, pl. xli, fig. 8, p. 332, *encaustus*, p. 333, Madagascar, Pasc., J. L. S. xix.

Neiphagus, n. g., near *Desmidophorus*, for *N. dentatus*, p. 333, pl. xli, fig. 7, *fascicularis*, p. 334, Mamboia, n. spp.; Pasc., J. L. S. xix.

Ithyporus petrosus, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 80, n. sp.

Acentrus, systematic position discussed, Faust, S. E. Z. xlvii, p. 23, etc.

Psepholax mediocris, New Zealand, Broun, Man. N. Z. Col., p. 909, n. sp.

Arrhetus, n. g., near *Strongylopterus*, for *A. volxemi*, Rio Janeiro, n. sp.; Pasc., C.R. ent. Belg. 1886, p. clv.

Ocladius plicicollis, p. 80, *costulatus maculosus*, p. 81, *costulipennis*, p. 82, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Camptorhinus nigro notatus, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 455; *C. brunneo-caudatus*, Madagascar, *id. op. cit.* vi, p. 82: n. spp.

Pachonyx laligantii, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 454, n. sp.

Acalles terricola, p. 934, *floricola*, p. 966, New Zealand, Broun, Man. N. Z. Col., n. spp.

Tychanus ventralis, New Zealand, Broun, Man. N. Z. Col., p. 935, n. sp.

Sympedius lepidus, New Zealand, Broun, Man. N. Z. Col., p. 935, n. sp.

Crisius obesulus, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, pl. xiii, fig. 16, p. 430, n. sp.

Agacalles, n. g., near *Acalles*, for *A. formosus*, New Zealand, n. sp.; Broun, Man. N. Z. Col., p. 967.

Bagous binodulus, metamorphoses and habits, Gad. de K.; Ann. Soc. Ent. Fr. (6) v, pp. 424-426.

Euthyrinus dorsalis, *irroratus*, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 189, n. spp.

Orphanistes grandis, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 190, n. sp.

Pantoxystus cyaneus, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 189, n. sp.

Peristhenes, n. g., near *Ædemonus*, p. 334, for *P. adustus*, Mamboia, n. sp., p. 335, pl. xli, fig. 9; Pasc., J. L. S. xix.

Oreda orthorhina, New Zealand, Broun, Man. N. Z. Col., p. 909, n. sp.

Cryptacrus scops, Para, Pasc., Ann. N. H. (5) xvii, p. 423, n. sp.

Diaporesis, n. g., for *D. distincta*, Chontales, n. sp.; Pasc., Ann. N. H. (5) xvii, p. 423.

Scelodolichus, presumably n. n. for *Dolichoscelis*, Broun, Man. N. Z. Col., p. 968.

Scelodolichus altulus, N. Zealand, Broun, Man. N. Z. Col. p. 968, n. sp.

Zygopides.

Piazurus stellaris, Peru, *latus*, *sacer*, Ega, p. 424, *diversus*, Ecuador, p. 425, Pasc., Ann. N. H. (5) xvii, n. spp.

Saphicus, n. g., near *Psolistus*, for *S. variegatus*, Madagascar, n. sp., pl. xli, fig. 4 ; Pasc., J. L. S. xix, p. 335.

Lisporhinus, n. g., p. 154, for *L. stoliczkae*, n. sp., N. W. India, p. 155 ; Faust, S. E. Z. xlvii.

Sympiezopus biguttulus, *pentaspilotus*, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 83, n. spp.

Cyllophorus, n. g. (*Sympiezopides*), p. 367, for *C. suturalis*, p. 368, *fasciatus*, p. 369, *sublineatus*, p. 370, Gaboon, n. spp. ; Faust, Deutsche e. Z. xxx.

Ceuthorhynchides.

Ceuthorhynchus nigroterminatus, Woll., referred to *Ceuthorhynchidius* ; Goz., Recherche, p. 31. *C. sulcicollis*, ravages ; Orm., Rep. x, pp. 87-89.

Ceuthorhynchus perelegans, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 455, n. sp.

Centrinus volæmi, Rio Janeiro, Pasc., C.R. ent. Belg. 1886, p. clvi, n. sp.

Baridiides.

Baris magister, Guiana, p. 425, *fervida*, Chontales, p. 426, Pasc., Ann. N. H. (5) xvii ; *B. acutesculpta*, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 84 ; *B. consuta*, N. W. India, Faust, S. E. Z. xlvii, p. 156 ; *B. coreanus*, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 218 : n. spp.

Barinus, n. g., near *Zygobaris*, p. 255, for *B. squamolineatus*, Illinois, n. sp., p. 256 ; Casey, Bull. Cal. Ac. Sci. ii.

Brachybaris, n. g., p. 371 (*Barinorum*), for *B. mexicanus*, Mexico, n. sp., p. 372 ; Faust, Deutsche e. Z. xxx.

Eurhinus cupreus, Mexico, *eximius*, Parana, Pasc., Ann. N. H. (5) xvii, p. 426, n. spp.

Ganymela, n. g., for *G. nitida*, Panama, n. sp. ; Pasc., Ann. N. H. (5) xvii, p. 427.

Eutoxus corax, Sarayacu, Pasc., Ann. N. H. (5) xvii, p. 427, n. sp.

Campyloscelides, Calandrides.

Epiphyllax aurolineatus, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 84, n. sp.

Oxyopisthen westermanni, Guinea, Auriv., Ent. Tidskr. 1886, p. 97, n. sp.

Haplorhynchus, n. g., near *Oxyopisthen*, p. 95, for *H. valdani*, n. sp., Camaroons, p. 96 ; Auriv., Ent. Tidskr. 1886.

Stenophida, n. g., near *Oxyopisthen*, for *S. linearis*, Mamboia, n. sp. ; Pasc., J. L. S. xix, p. 336.

Poteriophorus bowringii, Java, *fuscovarius*, Borneo, Wat., Ann. N. H. (5) xvii, p. 499, n. spp.

Phacecorynus funerarius, Murray, and *zamia*, Gyll., note on their ravages, pp. 125-127, with figure of larva, pl. v, figs. c 1-3 ; Westwood, Ann. Ent. Belg. xxx.

Scyphophorus acupunctatus, Gyll., metamorphoses ; Dug., Ann. Ent. Belg. xxx, p. 33, pl. ii, figs. 11-16.

Sphenophorus parvulus, Gyll., habits ; Webster, Riley, Rep. 1885

pp. 315 & 316. *S. spinolæ*, Gyll., metamorphoses ; Dug., Ann. Ent. Belg. xxx, p. 31, pl. ii, figs. 1-10.

Sphenophorus cumingii, Philippine islands, Wat., Ann. N. H. (5) xviii, p. 318 ; *S. nebulosus*, N. Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 192 : n. spp.

Cossonides.

Aparopion æquale, Lenkoran, Reitt., Radde Faun. Casp. p. 231, n. sp.

Cotaster, its position discussed and species reviewed ; Faust, S. E. Z. xlvii, pp. 28-31.

Cotaster paulinoi, Portugal, Stierl., MT. schw. ent. Ges. vii, p. 229, n. sp.

Rhyncolus corticalis, Boh., referred to *Allomimus* ; Schwarz, Ent. Am. ii, p. 20.

Rhyncolus latitarsis, Sweden, Th., Bull. Soc. Ent. Fr. (6) vi, p. xi, n. sp.

Pentarthrum angustum, *proximum*, p. 910, *spadiceum*, *servulum*, p. 911, *comatum*, p. 968, *morosum*, p. 969, New Zealand, Broun, Man. N. Z. Col. ; *P. cephalotes*, p. 430, *porcatum*, *confertum*, *constrictum*, pl. xiii, fig. 17, p. 431, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii : n. spp.

Microtribus pictonensis, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 432, n. sp.

Inosomus, Broun, recharacterized and referred to *Cossonides* ; Sharp, Tr. R. Dublin Soc. (2) iii, p. 432.

Rhinanisus sagax, New Zealand, Broun, Man. N. Z. Col. p. 969, n. sp.

Agastegnus coloratus, p. 911, *femoralis*, *sericatus*, p. 970, New Zealand, Broun, Man. N. Z. Col., n. spp.

Glyphorhamphus, n. g. ("*Pentarthride*"), p. 970, for *G. rarus*, n. sp., New Zealand, p. 971, Broun, Man. N. Z. Col.

Exomesites, n. g., p. 971, for *E. optimus*, n. sp., New Zealand, p. 972, Broun, Man. N. Z. Col.

Proconus crassipes, N. Zealand, Broun, Man. N. Z. Col. p. 912, n. sp.

Pselactus, n. g. approaching *Scolytidae*, for *P. punctatus*, n. sp., New Zealand ; Broun, Man. N. Z. Col. p. 972.

SCOLYTIDÆ.

[Cf. Bugnion (90), Casey (118), Eichhoff (164), Schwarz (645), Sharp, (655).]

Scolytus unispinosus, Lec., notes on ; Smith, Ent. Am. ii, p. 127.

Acanthurus, n. g., *Hylesinides*, p. 24, for *A. spinipennis*, p. 24, *ritsemæ*, p. 25, Sumatra, n. spp. ; Eich., Notes Leyd. Mus. viii.

Hylastes glabratus, Zett., = (*Hylurgops pinifex*) ; Schwarz, Ent. Am. ii, p. 56.

Hylesinus oleiperda, habits, &c. ; Bugnion, MT. schw. ent. Ges. vii, pp. 218-224, pl., figs 1 & 2. *H. aculeatus*, habits ; Kraus, Ent. Am. p. 76.

Phlæotribus olææ, galleries of, described and figured ; Bugnion, MT. schw. ent. Ges. vii, pp. 224 & 225, pl., fig. 3.

Phloeosinus dentatus, habits, &c. ; Knaus, Ent. Am. ii, p. 77. *P. serratus* noticed, *punctatus*, sexes of ; Schwarz, t. c. p. 56.

Bothrosternus hubbardi, Florida, Schwarz, Ent. Am. ii, p. 54, n. sp.

Cnesinus strigicollis, sexes described; Schwarz, Ent. Am. ii, p. 54.

Polygraphus pubescens: under this name three Swedish sp. are mixed, viz., *P. pubescens*, *P. subopacus*, Th., and *P. punctifrons*, n. sp.; Th., Bull. Soc. Ent. Fr. (6) vi, p. xi. *P. grandiclava*, Vosges, *id. t. c.* p. lxii, n. sp.

Renocis, n. g. near *Carphoborus*, p. 257, for *R. heterodoxus*, N. America, n. sp., p. 258, pl. vii, fig. 20; Casey, Bull. Cal. Ac. Sci. ii.

Oryphalus rigidus and *Jalapæ* noticed; Schwarz, Ent. Am. ii, p. 42. *O. scriba*, n. n. for *O. asperatus*, Ratz., *nec* Gyll.; Goz., Recherche, p. 31.

Gnathotrichus asperulus, habits; Schwarz, Ent. Am. ii, p. 40.

Xyleborus abnormis noticed; Eich., Notes Leyd. Mus. viii, p. 26. *X. pyri*, *retusicollis*, *xylographus*, *pubescens*, *punctipennis* noticed; Schwarz, Ent. Am. ii, pp. 41 & 42.

Ips, de Geer, = (*Tomicus*, auct.); Goz., Recherche, p. 31.

Tomicus, Latr., = (*Blastophagus*, Eich.); Goz., Recherche, p. 31.

Platydictylus, n. g., *Tomicides*, for *P. gracilipes*, Moluccas, n. sp.; Eich., Notes Leyd. Mus. viii, p. 25.

Inosomus, Broun, cf. *Cossonides*.

BRENTHIDÆ.

[Cf. Macleay (411).]

Phocylides pascoei, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 193, n. sp.

Miolispa cordiformis, p. 193, *ebenina*, p. 194, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, n. spp.

Ionthocerus pupuensis, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 194, n. sp.

ANTHOTRIBIDÆ.

[Cf. Fairmaire (174), Macleay (411), Quedenfeldt (572), Sharp (655).]

Cylindroides, n. g. near *Xylinades*, p. 455, for *C. alboplagiatus*, Obock, n. sp.; Fairmaire, Ann. Soc. Ent. Fr. (6) v, p. 456.

Xylinades sinuaticollis, Angola, Quedf., B. E. Z. xxx, p. 315, n. sp.

Phlæotragus gigas and *heros*, Fab., noticed; Quedf., B. E. Z. xxx, pp. 303 & 304. *P. similis*, Angola, p. 305, *id. t. c.*, n. sp.

Mecocerus sulphureus, Waterh., figured; Waterh., Aid, pl. 171, fig. 3.

Mecocerus mechowii, p. 307, pl. viii, fig. 1, *rhombeus*, p. 308, fig. 2, Angola, Quedf., B. E. Z. xxx, n. spp.

Tophoderes annulatus, Waterh., figured; Waterh., Aid, pl. 171, fig. 1.

Tophoderes dorsalis, Quango river, p. 308, pl. viii, fig. 3, Quedf., B. E. Z. xxx, n. sp.

Litocerus fasciatus, *parvulus*, *subconvexus*, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 195, n. spp.

Diastatropis olivaceus, Waterh., figured; Waterh., Aid, pl. 171, fig. 2.

Nessiara unituberculata, *irrorata*, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 196, n. spp.

Proscoporphinus albifrons, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, pl. xiii, fig. 19, p. 435, n. sp.

Anocerastes undulatus, p. 309, pl. viii, fig. 4, *subcostatus*, p. 310, Angola, Quedf., B. E. Z. xxx, n. spp.

Deuteroocrates nigropictus, Quango river, p. 312, pl. viii, fig. 5, *canescens*, Angola, p. 313, pl. viii, fig. 6, Quedf., B. E. Z. xxx, n. spp.

Deuteroocrates caricollis, Har., *griseopictus*, Jek., noticed; Quedf., B. E. Z. xxx, p. 311.

Polycorynus compressicornis n. var. *albosignatus*, Quango river; Quedf., B. E. Z. xxx, p. 317, pl. viii, fig. 7.

Aneurhinus leucomelas, Quango river, p. 318, pl. viii, fig. 8, *nigrosignatus*, Cape Good Hope, p. 319, Quedf., B. E. Z. xxx, n. spp.

Phlaëobius quadricommatus, Angola, Quedf., B. E. Z. xxx, p. 320, n. sp.

Aulodes, n. g. (*Eugonidae*), p. 321, for *A. picturatus*, Cape Good Hope, p. 322, *bifasciatus*, Arabia and Suakim, p. 323, pl. viii, fig. 9, Quedf., B. E. Z. xxx, n. spp.

Anthrribus tuberosus, p. 433, pl. xiii, fig. 13, *cucullatus*, *inornatus*, p. 434, *concolor*, *obtusius*, p. 435, New Zealand; Sharp, Tr. R. Dublin Soc. (2) iii.

Choragus sheppardi, Kirb., = (*pygmaeus*, Rob.); Heyd., Wien. ent. Z. v, p. 199.

BRUCHIDÆ.

[*Cf.* Baudi (35, 36), Sharp (655).]

Revision of the European species of *Urodontides*; Baudi (35).

Bruchus granarius, L., ravages, &c.; Orm., Rep. ix, pp. 6-8. *B. rufimanus*; Wood (748).

Bruchus lepriouri, Algeria, Jacq., Bull. Soc. Ent. Fr. (6) vi, p. clxxi; *B. terrenus*, *urbanus*, p. 35, *ademptus*, *comptus*, p. 36, *lautus*, p. 37, Japan, Sharp, Ann. N. H. (5) xvii; *Mylabris tetragona*, p. 401, and Nat. Sicil. v, p. 28, *dentipes*, p. 405, Syria, Baudi, Deutsche e. Z. xxx: n. spp.

Spermophagus canus, Turcomania, p. 111, *caucasicus*, Caucasus, Baudi, Nat. Sicil. v; *S. complectus*, Japan, Sharp, Ann. N. H. (5) xvii, p. 37: n. spp.

Pygobrachus, n. g., for *P. scutellaris*, Japan, n. sp., Sharp, Ann. N. H. (5) xvii, p. 38.

CERAMBYCIDÆ.

[*Cf.* Aurivillius (17, 18), Berg (47), Broun (86), Dugès (156), Fairmaire (174, 175, 176), Ganglbauer (225, 231, 232, 233, 573), Heyden (286, 287), Kolbe (360), Lansberge (389, 390), Macleay (411), Pascoe (523), Poll (546, 547, 548), Reitter (588), Sharp (655), Waterhouse (726).]

Mysteria cylindripennis, Th. = (*Prionidium molle*, Burm.); Berg., An. Soc. Arg. xxi, p. 234.

Prionides.

Hypoccephalus armatus, note on; Leng., Ent. Am. i, pp. 189-193.

Prionocalus cacicus, White, noticed; Bull. Soc. Ent. Fr. (6) v, p. clxxvii.

Dorysthenes davidis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 353, n. sp.

Cyrtognathus angulicollis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 354, n. sp.

Prionus imbricornis, L., habits of larva ; Hamilton, Canad. Ent. xviii, p. 112.

Tithoes palinii, Hope, figured ; Waterh., Aid, pl. 167, fig. 1.

Macrodonia cervicornis, note on, with wood engravings ; Girard, La Nature 1886 (2), pp. 49-51.

Ergates faber, L., habits of larva ; B. E. Z. xxx, pp. xvi & xvii.

Brephilydia, Pasc., errors about this genus and its two species corrected ; Poll., Notes Leyd. Mus. viii, p. 130.

Mallodon spinibarbis, L., is a variable insect, and = (*bonariensis* and *orbigny*, Th.) ; Berg., An. Soc. Arg. xxi, p. 235. *M. melanopus*, habits of larva, P. E. S. Wash. i, p. 13.

Euryypoda davidis, Tchê-Kiang, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 355, n. sp.

Philus antennatus, Gyll., note on ♀ of ; Heyd., Deutsche e. Z. xxx, p. 287.

Philus ophthalmicus, N. Borneo, Pasc., Ann. N. H. (5) xvii, p. 239, n. sp.

Calocomus coriaceus, Fairm. (1864) = (*coriaceus*, Burm. 1865) ; Berg., An. Soc. Arg. xxi, p. 235.

Cerambycides.

Paroeme, n. g., *Oemidarum*, p. 90, for *P. bispina*, n. sp., Camaroons, p. 91 ; Auriv., Ent. Tidskr. 1886.

Malacopterus lineatus, Guer. = (*vittatus*, Lec.) ; Horu., Tr. Am. Ent. Soc. xiii, p. xiii.

Opsamatus dimidiatus, fig. 7, *purpureipennis*, fig. 18, figured ; Waterh., Aid, pl. 171.

Dissopachys, n. g., near *Cerambyx*, for *D. pulvinata*, Turcomania, n. sp. ; Reitt., Deutsche e. Z. xxx, p. 68.

Cerambyx cerdo, L., note on habits, Westhoff, JB. westf. Ver. 1885, p. 16 : teratology, Bull. Soc. Ent. Fr. (6) vi, p. clxxx. *C. scopolii*, Füss., monstrosity, Friv., Term. füzetek. x, p. 80, pl. iv, fig. 12. *C. miles* and *nodulosus*, distinctions of ; Kraatz, Deutsche e. Z. xxx, p. 47.

Rhytidodera integra, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 237, n. sp.

Hesperophanes rusticus, Korea, Gangl., Hor. Ent. Ross. xx, p. 133 ; *H. flavopubescens*, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 219 : n. spp.

Perilasius, Bates, affinities noticed ; Horn, P. Am. Ent. Soc. xiii, p. x.

Stromatium turkestanicum, Turkestan, Heyd., Deutsche e. Z. xxx, p. 193, n. sp.

Eburia quadrigeminata, longevity of ; M'Neil (455).

Centrocerum exornatum, Chev., = (*Ibidium argentinum*, Burm.) ; Berg., An. Soc. Arg. xxi, p. 235.

Elaphidion villosus, Fab., habits of ; Clarkson, Rep. E. Soc. Ont. xvi, p. 26. *E. parallelum*, Newm., and *Phymatodes variabilis*, Fab., habits of ; Townsend, Canad. Ent. xviii, pp. 12-14 & 160.

Demelius semirugosus, Wat., ♂ described ; Poll, Notes Leyd. Mus. viii, p. 242.

Trichophorus albomaculatus, Burm., and *interrogationis*, Blanchd., distinguished ; Berg, An. Soc. Arg. xxi, p. 236.

Miopteryx spinigera, Bl., appears in the Munich Catalogue in *Peribœum* as well as in *Miopteryx*; Berg, An. Soc. Arg. xxi, p. 236.

Æmona, characters of sexes noticed, species described; Sharp, Tr. R. Dublin Soc. (2) iii, pp. 436-439.

Æmona villosa, *plicicollis*, p. 437, *inaequalis*, p. 438, *mutica*, *debilis*, p. 439, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, n. spp.

Didymacantha quadriguttata, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 440, n. sp.

Ophryops dispar, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, pl. xiii, fig. 20, p. 439, n. sp.

Anencyrus, n. g., near *Gastrosarus*, for *A. discedens*, New Zealand, n. sp.; Sharp, Tr. R. Dublin Soc. (2) iii, p. 441.

Piesarthrus marginellus, Hope, = (*Anatisis plagiatus*, White); Poll., Notes Leyd. Mus. viii, p. 222.

Ceralomus, n. g., near *Calliprason*, for *C. morosus*, New Zealand; Sharp, Tr. R. Dublin Soc. (2) iii, p. 442.

Stenocorus pygmeus, Talysch, Gangl., Radde Faun. Casp. p. 234, n. sp.

Leptura, L., = (*Strangalia*, Muls.); Goz., Recherche, p. 33.

Corymbia, n. g., for a portion of *Leptura*, auct.; type *L. rubra*, L.: Goz., Recherche, p. 33.

Leptura hybrida and *ochracea*, Roy, noticed; Heyd., Deutsche e. Z. xxx, p. 85. *L. varicornis*, American example discussed; Dohrn, S. E. Z. xlvii, p. 191. *L. spuria*, Lec., is ♂ of *Acmacops militaris*, Lec., and *L. quadrata*, Lec., is a color var. of *convexa*, itself a race of *instabilis*; Horn, P. Am. Ent. Soc. xiii, p. xiii. *L. brevicornis*, Lec., characters: *L. vexatrix*, Mann., is a valid species; *id. t. c. p.* xiv. *L. rubra* n. var. *muliebris*, from Suyfun River; Heyd. Deutsche e. Z. xxx, p. 273.

Dokhtoureffia, n. g., near *Strangalia*, for *D. turkestanica*, n. sp., Turkestan; Gangl., Hor. Ent. Ross. xx, p. 129.

Pidonia bicolor, Suyfun River, Heyd., Deutsche e. Z. xxx, p. 276, n. sp.

Sieversia, n. g., p. 133, near *Pidonia*, for *S. bicolor*, Korea, n. sp., p. 134; Gangl., Hor. Ent. Ross. xx.

Pachyta tuberculicollis, Blch., = (*Gaurotes davidis*, Deyr.); Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 356.

Anoplodera ventralis, n. n. for *rufiventris*, Tourn., nec Gebl.; Heyd., Deutsche e. Z. xxx, p. 85.

Gramnoptera tibialis, n. varr. *tibialis* and *geniculata*; Kraatz, Radde Faun. Casp. p. 234. *G. ruficornis* n. var. *obscuricornis*; *id.*

Vesperus xatarti, metamorphoses and habits; Xamheu, Bull. Ins. Agr. xi, pp. 167-173.

Vesperus creticus, Crete, Gangl., S. E. Z. xlvii, p. 310, n. sp.

Bimia bicolor, var. = (*femoralis*, Saund.); Poll., Notes Leyd. Mus. viii, p. 224.

Bimia maculicornis, Victoria, Poll., Notes Leyd. Mus. viii, p. 223, n. sp.

Necydalis, L., = (*Molorchus*, F.); *Gymnopterion*, Schrk., = (*Molorchus*, auct.); Goz., Recherche, p. 32.

Nenenia, n. g., p. 240, near *Phalota*, for *N. aurulenta*, Melbourne, n. sp., p. 241; Pasc., Ann. N. H. (5) xvii.

Distichocera kirbyi, Newm., = (*mutator*, Pasc.) ; Poll, Notes Leyd. Mus. viii, p. 222.

Prothema variicornis, Labuan, Pasc., Ann. N. H. (5) xvii, p. 240, n. sp.

Aphrodisium de-la-touchii, China, Fairm., Bull. Soc. Ent. Fr. (6) vi, p. clxii, n. sp.

Aromia (Chloridolum) sieversi, Corea, Gangl., Hor. Ent. Ross. xx, p. 135, n. sp.

Callichroma vethi, Humpata, Lansb., Notes Leyd. Mus. viii, p. 117, n. sp.

Hypatium resplendens, Congo, Lansb., Notes Leyd. Mus. viii, p. 119, n. sp.

Litopus impressicollis, Humpata, Lansb., Notes Leyd. Mus. viii, p. 119, n. sp.

Compsocerus aulicus, Th., = (*Orthostoma thyrso-phora*, Burm.) ; *C. equestris*, Guér., = (*Cosmisoma equestris*, Burm.) ; Berg, An. Soc. Arg. xxi, pp. 235 & 236.

Orthostoma parviscopa, Burm., referred to *Compsocerus* ; Berg, An. Soc. Arg. xxi, p. 237.

Brachyrrhopala, Burm. : note on the validity of the genus, and referring to it *Chrysoprasis iridipennis*, Chev., = (*aurivitta*, Burm.), and *Rhopalophora versicolor*, Chev., = (*semirubra*, Burm.) ; Berg, An. Soc. Arg. xxi, p. 239.

Callidium, F., = (*Hylotrupes* auct.) ; Goz., Recherche, p. 32.

Meridion, n. n. for *Callidium*, Serv. et auct. ; Goz., Recherche, p. 32.

Prionopsis, n. g. (*Callidiides*) for *P. metallicolor*, Madagascar, n. sp. ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 85.

Clytus acutus, Germ., = (*exsanguis*, Chev.) ; *proximus*, Gory, = (*elongatus*, Chev., and *multiguttatus*, Burm.) ; *C. famelicus*, Burm., is a distinct species ; Berg, An. Soc. Arg. xxi, p. 238. *C. arcuatus*, L., monstrosity ; Friv., Term. füzetek. x, p. 80, pl. iv, fig. 11. *C. fuldermanni* and *verbasci* differentiated ; Reitt., Wien. ent. Z. v, p. 99. *C. gazella*, F., = (*rhamni*, Germ.) ; Goz., Recherche, p. 32. *C. arietis* n. var. *lederi* ; Gangl., Radde Faun. Casp. p. 232. *C. nigripes*, Brullé, characters for ; Gangl., Deutsche e. Z. xxx, p. 88.

Clytus velutinus, New Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 202 ; *C. (Clytanthus) sparsus*, Adalia, Reitt., Deutsche e. Z. xxx, p. 67 ; *C. (Clytanthus) herzianus*, p. 134, *motschulskyi*, p. 135, Corea, Gangl., Hor. Ent. Ross. xx : n. spp.

Clytanthus angustulus, New Guinea, MacL., P. Linn. Soc. N.S.W. (2) i, p. 203, n. sp.

Anaglyptus ganglbaueri, Lenkoran, Reitt., Deutsche e. Z. xxx, p. 67 ; *A. raddei*, p. 232, pl. i, fig. 1, *reitteri*, p. 233, Caspian region, Gangl., Radde Faun. Casp. : n. spp.

Epipedocera leucaspis, Sarawak, Pasc., Ann. N. H. (5) xvii, p. 241, n. sp.

Listroptera parana, Gemm. referred to *Diammatophora* and = (*L. perforata*, Burm. nec. Kl.) ; Berg, An. Soc. Arg. xxi, p. 240.

Cosmisoma nodicollis, Burm., is a *Cosmosoma*, not a *Compsocerus*, as given in Munich Catalogue ; Berg., An. Soc. Arg. xxi, p. 238.

Cosmisoma gracilior, Burm., referred to *Unxia*, Th.; Berg, An. Soc. Arg. xxi, p. 237.

Stenosphenus lugens, Lec. = (*hirsutipennis*, Bates); Horn, P. Am. Ent. Soc. xiii, p. xii.

Amphidesmus theorini, Gaboon, Auriv., Ent. Tidskr. 1886, p. 89, n. sp.

Stenaspis plagiatus, Waterh., figured; Waterh., Aid, pl. 171, fig. 6.

Purpuricenus lituratus, Corea, Gangl., Hor. Ent. Ross. xx, p. 136, n. sp.

Oxymerus saundersii, Corrientes, Wat., Ann. N. H. (5) xvii, p. 500, n. sp.

Cladopalpus, n. g. (*Disteniides*), p. 35, for *C. hageni*, Sumatra, n. sp., p. 36; Lansb., Notes Leyd. Mus. viii.

Lamiides.

Tmesisternus frogatti, p. 200, *lineatus*, p. 201, *lateralis*, p. 202, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, n. spp.

Xylotoles sandageri, p. 912, *maculosus*, p. 913, *angustulus*, p. 973, New Zealand, Broun, Man. N. Z. Col.; *X. germanus*, *fasciatus*, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 443: n. spp.

Stenellipsis cuneata, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, pl. xiii, fig. 21, p. 443, n. sp.

Anexodius, n. g., p. 241, near *Microtragus*, for *A. aquilus*, N. Borneo, n. sp., p. 242; Pasc., Ann. N. H. (5) xvii.

Moneilema variolare, Th., metamorphoses; Dug., Ann. Ent. Belg. xxx, p. 29, pl. i, figs. 15-22.

Dorcadion merkli, Gangl., colour, aberration; Friv., Term. füzetek. x, p. 80, pl. iv, fig. 13. *D. talyschense*, Gangl., noticed, *D. carinatum*, n. var. *cylindraceum*, Reitt., Deutsche e. Z. xxx, p. 67.

Dorcadion dokhtouroffi, Turkestan, Gangl., Hor. Ent. Ross. xx, p. 130, n. sp.

Lamia adelpha, Corea, Gangl., Hor. Ent. Ross. xx, p. 137, n. sp.

Lamiomimus, n. g. (*Monohammini*), p. 223, for *L. gottschei*, n. sp., Korea, p. 224, pl. xi, fig. 39; Kolbe, Arch. f. Nat. lii, 1.

Macrohammus, n. g., p. 52, for *Monochamus deyrollei*, Th., the species described, p. 53, and figured; Auriv., Ent. Tidskr. 1886.

Monohammus xfulvum, fig. 1, *pictor*, Bates, fig. 2, figured; Waterh., Aid, pl. 170.

Batomena multispinis, Bates, figured; Waterh., Aid, pl. 170, fig. 3.

Tricholamia plagiata, Bates, figured; Waterh., Aid, pl. 170, fig. 4.

Melanopolia farinosa, Bates, figured; Waterh., Aid, pl. 170, fig. 5.

Noserocera tuberosa, Bates, figured; Waterh., Aid, pl. 170, fig. 6.

Melanuuster davidis, Yunnan, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 356, n. sp.

Cerosterna oblita, Chili, Fairm., Bull. Soc. Ent. Fr. (6) v, p. clxxxix, n. sp. [? misprint for *Cerostena*, a genus of *Tenebrionide*.—D. S.].

Neopharsalia, n. g., near *Pharsalia*, for *N. costeri*, Sumatra, n. sp.; Poll., Notes Leyd. Mus. viii, p. 27, pl. i, figs. 1 & 1a.

Rosenbergia megaloccephala, Pt. Darwin, Poll., Notes Leyd. Mus. viii, p. 32, pl. i, figs. 5 & 5a, n. sp.

Batocera roylei, painted ex. = (*porus*, Parry) ; Poll. Notes Leyd. Mus. viii, p. 30. *B. calanus*, Parry, differentiated from *B. roylei*, Hope ; *id. t. c.* p. 29. *B. rubus*, L., n. var. *coreana* ; Kolbe, Arch. f. Nat. lii, 1, p. 238.

Batocera frenchi, Queensland, Poll., Notes Leyd. Mus. viii, p. 30, pl. i, fig. 4, n. sp.

Acridocephala variegata, Camaroons, Auriv., Ent. Tidskr. 1886, p. 93, n. sp.

Megacriodes saundersii, Pasc., ♂ described ; *forbesii*, Waterh., is not distinct from it : Poll., Tijdschr. Ent. xxix, pp. 143 & 144.

Mesosa stictica, Blch., = (*oculicollis*, Fairm.) ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 356.

Coptops nigropictus, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 85, n. sp.

Sternotomis picta, W. Africa, p. 500, *bohndorffii*, Niam-Niam, p. 501, Wat., Ann. N. H. (5) xvii, n. spp.

Phymasterna cyancoguttata, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 86, n. sp.

Phryneta regia, p. 91, *nigropilosa*, p. 92, Camaroons, Auriv., Ent. Tidskr. 1886, n. spp.

Chreostes oberthurii, Zanzibar, Pasc., Ann. N. H. (5) xvii, p. 243, n. sp.

Thylactus longipennis, Old Calabar, Pasc., Ann. N. H. (5) xvii, p. 242, n. sp.

Orinome rubricollis, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 199, n. sp.

Leucographus, Wat., affinities noticed ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 86. *L. alborarius*, Wat., = (*Coptops pyramidulis*, Fairm.) ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 86.

Dichostates vagepictus, Obock, p. 456, *strigifrons*, Soudan, p. 457, Fairm., Ann. Soc. Ent. Fr. (6) v, n. spp.

Ranova fusco-signata, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 86, n. sp.

Moechotypa fuliginosa, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 221, pl. xi, fig. 38, n. sp.

Praonetha laterifusca, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 460 ; *P. pallida*, *bizonata*, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 198 : n. spp.

Egomomus ornatus, New Guinea, Macl., P. Linn. Soc. N.S.W. (2) i, p. 197, n. sp.

Dystasia nubila, Sumatra, Pasc., Ann. N. H. (5) xvii, p. 245, n. sp.

Sympiodes, n. g. near *Enaretta*, for *S. varius*, Delagoa Bay, n. sp. ; Pasc., Ann. N. H. (5) xvii, p. 243.

Zeargyra, n. g., p. 245, near *Gyaritus*, for *Z. vidua*, N. Borneo, n. sp., p. 216 ; Pasc., Ann. N. H. (5) xvii.

Apomecyna albopicta, Delagoa Bay, Pasc., Ann. N. H. (5) xvii, p. 245, n. sp.

Discolops, n. g. near *Plocia*, for *D. strigicollis*, Obock, n. sp. ; Fairm., Ann. Soc. Ent. Fr. (6) v, p. 459.

Tetorea longipennis, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii, p. 445, pl. xiii, fig. 22, n. sp.

Pogoncharus sieversi, Caucasus, Ganglbauer, Hor. Ent. Ross. xx, p. 139;
P. cristulatus, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 458 : n. spp.

Pœcilippe, Bates, generic characters of ; Sharp, Tr. R. Dublin Soc.
 (2) iii, p. 444.

Pœcilippe medialis, *femoralis*, New Zealand, Sharp, Tr. R. Dublin Soc.
 (2) iii, p. 444, n. spp.

Composoma quadriplagiatum, Boh., = (*albigena*, Burm.) ; Berg, An.
 Soc. Arg. xxi, p. 240.

Oncideres ægrotus, Th., *saga*, Dalm., *impluviatus*, Germ., habits noticed ;
 Müll., Kosmos, xix, pp. 36-38. *O. heterocera* noticed ; Goldi, in Journ. do
 Agricultor, Ann. 7, T. xiv, p. 332 [*cf.* Zool. Anz. ix, p. 674].

Tanylamia, n. g. near *Ectatosia*, for *T. melanura*, Madagascar, n. sp. ;
 Pascoe, Ann. N. H. (5) xvii, p. 244.

Emphytæcia versicolor (Boh.), Lec., noticed, = (*Phytæcia sanguinicollis*,
 Bürm.) ; Berg, An. Soc. Arg. xxi, p. 240.

Nyssodrys haldemanni, Lec., = (*contempta*, Bates) ; Horn, P. Am. Ent.
 Soc. xiii, p. xii.

Cyrtinus = (*Myrmolamia*, Bates) ; Horn, P. Am. Ent. Soc. xiii, p. xi.

Superda carcharias, tarsal hairs and glands ; Dahl, (133) pp. 237, &c.,
 pl. xiii, figs. 16 & 17 : monstrous antennæ of ; Gressner, S. E. Z. xlvii,
 p. 166, woodcut. *S. populnea*, L., *Phorostoma parvula* is a parasite of
 this ; Wien. ent. Z. v, p. 307.

Phytæcia pustulata, Schr., n. var. *pulla*, Taschkent ; Gangl., Hor. Ent.
 Ross. xx, p. 130.

Mallosia scovitzii noticed ; Reitt., Deutsche e. Z. xxx, p. 70.

Tetraopes rubro-cinereus, Thoms., is identical with *T. discoideus*, Lec. ;
 Horn, P. Am. Ent. Soc. xiii, p. xiii.

Menesia sulphurata, Gebl., n. var. *flavotecta*, Heyd., Deutsche e. Z. xxx,
 p. 276 ; *M. albifrons*, Suyfun River, *id. l. c.* : n. sp.

Amphionycha petroneæ, Burm., is a variable species, and = (*spilota*,
 Bates) ; Berg, An. Soc. Arg. xxi, p. 240.

CHRYSEMELIDÆ.

[*Cf.* Baly (24, 25, 26, 27, 247), Costa (132), Dugès (156), Fairmaire
 (174, 175), Gadeau (224), Gozis (252), Heyden (286, 288), Jacoby (247,
 323, 324, 325, 326, 327), Kolbe (360), Lefèvre (21, 394), Marseul (420),
 Reitter (588), Sharp (655), Weise (728, 729).]

Sagrides, *Donaciides*, *Criocerides*.

Sagra buquetii, cocoons of, noticed ; Bull. Soc. Ent. Fr. (6) vi, p. lxxxv.

Donacia, tarsal hairs, Dahl, (133) p. 240 ; *D. bicolora*, n. var. *meridionalis*,
 described, Weise, Deutsche e. Z. xxx, p. 250.

Crioceris, Geof. = (*Lema*, F.) ; Goz., Recherche, p. 33.

Oulema, n. n. for *Lema* auct. ; Goz., Recherche, p. 33.

Crioceris asparagi, habits ; Bull. Soc. Ent. Fr. (6) vi, p. cxlix.

Clythrìdes.

Labidostomis mesopotamica, Asia Minor, Heyd., Deutsche e. Z. xxx,
 p. 279, n. sp.

Melolontha, Geoff. = (*Clytra* auct.), Goz., Recherche, p. 33.

Clytra philippinensis, p. 191, *semperi*, p. 192, Philippines, Lefv., Ann. Soc. Ent. Fr. (6) vi; *C. coreana*, Korea, Kolbe, Arch. f. Nat. lii, 1, p. 226 : n. spp.

Gynandrophthalma atripennis, Lac., var. = (*woerdeni*, Rits.); Lefv., Notes Leyd. Mus. viii, p. 145.

Gynandrophthalma decora, Benguela, Lefv., Notes Leyd. Mus. viii, p. 145, n. sp.

Saxinis (sub. *Clytra*) *humeralis*, Fab. = (*omogera*, Lac.); Horn, Tr. Am. Ent. Soc. xiii, p. 142.

Cryptocephalus, cedeagus of some species figured, Deutsche e. Z. xxx, pl. i, p. 26; *C. notatus*, Fab. = (*quadrinaculatus*, Say.); Horn., Tr. Am. Ent. Soc. xiii, p. 142.

Cryptocephalus agraphus, *lissopterus*, France, Goz., Recherche, p. 34, n. spp. ?; *C. weisei*, Syria, Reitt., Deutsche e. Z. xxx, p. 70; *C. equiseti*, *cognatus*, Sardinia, Costa, Rend. Acc. Nap. xxv, p. 52; *C. abdominalis*, Algeria, Weise, Deutsche e. Z. xxx, p. 208; *C. heydeni*, Turkestan, *id. t. c.* p. 193 : n. spp.

Pachybrachys, the cedeagus of numerous species figured; Deutsche e. Z. xxx, pl. i, p. 26.

Pachybrachys creticus, Crete, p. 21, *oertzeni*, Greece, p. 22, *etruscus*, Florence, p. 23, *adaliensis*, Asia Minor, p. 24, Weise, Deutsche e. Z. xxx : n. spp.

Eumolpides.

Eucolaspis, n. g., *Iphimaites*, for most of the New Zealand species of *Colapsis*; Sharp, Tr. R. Dublin Soc. (2) iii, p. 446.

Atrichatus, n. g., near *Eucolaspis*, for *Colaspis ochraceus*, Broun; Sharp, Tr. R. Dublin Soc. (2) iii, p. 446: the species figured, *t. c.*, pl. xiii, fig. 24.

Pilacolaspis, n. g., p. 446, near *Eucolaspis*, for *P. Wakefieldi*, New Zealand, n. sp.; Sharp, Tr. R. Dublin Soc. (2) iii, p. 447.

Colaspis jacobyi, Guatemala, p. cxc, *fastidiosa*, Colombia, p. exci, Lefv., Bull. Soc. Ent. Fr. (6) v; *C. lutescens*, Peru, *id. op. cit.* vi, p. cxxxviii : n. spp.

Metaxyonycha signata, p. clxxxix, *validicornis*, p. cxc, Brazil, Lefv., Bull. Soc. Ent. Fr. (6) v, n. spp.

Rhabdopterus (sub *Colaspis*) *picipes*, Ol., = (*pratexta*, Say); Horn, Tr. Am. Ent. Soc. xiii, p. 142.

Rhabdopterus decipiens, Cayenne, Lefv., Bull. Soc. Ent. Fr. (6) vi, p. cxxxviii, n. sp.

Alethaxius striatulus, Colombia, Lefv., Bull. Soc. Ent. Fr. (6) vi, p. cxxxix, n. sp.

Nodostoma flavopustulatum, Baly, var. probably = (*consimile*, Baly); *N. balyi*, Har., = (*japonicum*, Jac.): Jac., P. Z. S. 1885, p. 752.

Nodostoma varicolor, Japan, Jac., P. Z. S. 1885, p. 751; *N. binotatum*, *thoracicum*, Philippines, Lefv., Ann. Soc. Ent. Fr. (6) vi, p. 192 : n. spp.

Scelodonta nebulosa, Lec., = (*Metachroma cuprea*, Prov.); Horn, P. Am. Ent. Soc. xiii, p. xiv.

Lypesthes ater, Motsch., when worn = (*Leptotes pulverulentus*, Jac.); Jac., P. Z. S. 1885, p. 752.

Nerissus hispidulus, Niam-Niam, Lefv., Notes Leyd. Mus. viii, p. 146, n. sp.

Dicolectes, n. g., near *Nerissus*, *Cheirideitæ*, for *D. aulicus*, Assinie, p. lx, *rugulosus*, Niam-Niam, *erythropus*, Angola, p. lxi, n. spp., Lefv., Bull. Soc. Ent. Fr. (6) vi; *D. rugulosus*, Niam-Niam, Lefv., Notes Leyd. Mus. viii, p. 146 : n. sp.

Pseudocolaspis lefevrei, Baly, redescribed; Fairm., Ann. Soc. Ent. Fr. (6) v, p. 460.

Pseudocolaspis albostrata, Abyssinia, Jac., Ann. Mus. Genov. (2) iv, p. 122; *P. setulosa*, *pruinosa*, W. Africa, Lefv., Notes Leyd. Mus. viii, p. 147 : n. spp.

Metachroma (sub *Colaspis*) *lurida*, Ol., = (*vicina*, Crotch); Horn, Tr. Am. Ent. Soc. xiii, p. 143.

Trichostola magnicollis, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 461, n. sp.

Rhyparida nigrolimbata, Rits., referred to *Syagrus*, and redescribed; Lefv., Notes Leyd. Mus. viii, p. 148.

Colasposoma æmulum, Niam-Niam, Lefv., Notes Leyd. Mus. viii, p. 145; *C. subsericans*, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 87; *C. gregarium*, Philippines, Lefv., t. c. p. 193 : n. spp.

Pachnephorus syriacus, Syria, Reitt., Deutsche e. Z. xxx, p. 71, n. sp.

Paria (sub *Eumolpus*) *canella*, Fab., = (*sexnotata*, Say); Horn, Tr. Am. Ent. Soc. xiii, p. 143.

Eurydemus punctato-sulcatus, Nossi Bé, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 87, n. sp.

Pheloticus semistriatus, *seriepunctatus*, p. 91, *fumatidorsis*, p. 92, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Pseudosyagrus, n. g., near *Syagrus*, for *P. grossepunctatus*, Madagascar, n. sp., Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 88.

Syagrus bipartitus, Nossi Bé, p. 88, *strigicollis*, *attelaboides*, Madagascar, p. 89, Fairm., Ann. Soc. Ent. Fr. (6) vi, n. spp.

Rhembastus hypomelas, Mossamedes, Lefv., Notes Leyd. Mus. viii, p. 148; *R. melanostictus*, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 461 : n. spp.

Corynodes abyssinica, Abyssinia, Jac., Ann. Mus. Genov. (2) iv, p. 123, n. sp.

Colaspoides igneicollis, Peru, Lefv., Bull. Soc. Ent. Fr. (6) vi, p. cxxxix, n. sp.

Chrysomelides.

"Monographie des *Chrysomélides*, de l'ancien monde." The genus *Chrysomela* is commenced, occupying pp. 109-156, L'Abeille, 1886, without author's name.

Chrysomela, œdeagus of several species figured; Deutsche e. Z. xxx, pl. i, p. 26. *C. goettingensis*, tarsal hairs, p. 239, pl. xii, fig. 10b; Dahl (133). *C. scalaris*, Lec., variation of; Towns., Ent. Am. ii, p. 57.

Chrysomela scorodon, p. 120, *vermiculosa*, p. 127, Algeria, L'Abeille,

1886 ; *C. amethystina*, p. 228, *cupraria* (Eversmann), p. 229, Korea, Kolbe, Arch. f. Nat. lii, 1 ; *C. brevilata*, Turkestan, Heyd, Deutsche e. Z. xxx, p. 277 : n. spp.

Orina plagiata, Suff., larva and its food-plant ; Deutsche e. Z. xxx, pp. 29 & 30.

Phædon betulæ, L., ravages ; Orm., Rep. ix, pp. 55-58 ; *id. it.* x, pp. 58, &c.

Prasocuris (sub *Helodes*) *vittata*, Ol., = (*varipes*, Lec) ; Horn, Tr. Am. Ent. Soc. xiii, p. 140.

Plagioderæ scabricula, Stål, metamorphoses ; Dug., Ann. Ent. Belg. xxx, p. 36, pl. iii, figs. 1-10.

Melasoma tremulæ, F., and *saliceti*, Ws., œdeagus figured ; Deutsche e. Z. xxx, pl. i, p. 26. *M. (Lina) lineatopunctata*, Forst., metamorphoses ; Dug., Ann. Ent. Belg. xxx, p. 34, pl. ii, figs. 17-30. *Lina tremulæ*, ravages of ; Bull. Soc. Ent. Fr. (6) vi, p. clxxxi. *L. populi*, mode of parasitism of *Tachina* on ; Meinert (433). *L. scripta*, Fab., variation of ; Towns., Ent. Am. ii, p. 59.

Sphærolina templetoni, Hope, = (*davidis*, Fairm.) ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 356.

Paralina fallaciosa, Stål, = (*impressiuscula*, Fairm. ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 356.

Deuterocampta discicollis, Amazons, Jac., P. Z. S. 1885, p. 927, n. sp.

Doryphora 10-lineata, Say, variation of ; Towns., Ent. Am. ii, p. 57.

Doryphora gratiosa, p. 925, *oberthuri*, p. 926, *pictipennis*, p. 927, Amazons, Jac., P. Z. S. 1885 n. spp.

Cyrtonus montanus, œdeagus figured ; Deutsche e. Z. pl. i, fig. 50.

Phytodecta, œdeagus of numerous species figured ; Deutsche e. Z. xxx, pl. i, p. 26. *P. viminalis*, L., and *nivosa*, Suff., synonymy of varieties of discussed ; Heyd., Deutsche e. Z. xxx, pp. 85 & 86.

Phytodecta weisei, Portugal, Reitt., Deutsche e. Z. xxx, p. 72, n. sp.

Phyllodectu polaris (Sahl.), n.s., from Arctic regions noticed ; Schneider, Tromsø Mus. Aarsh. ix, p. 66.

Phratora vitellinæ, spermatozoa ; St. George (686).

Caccomolpus, n. g., p. 447, of *Chrysomelites*, for *C. globosus*, p. 447, pl. xiii, fig. 23, *plagiatus*, p. 448, New Zealand, n. spp. ; Sharp, Tr. R. Dublin Soc. (2) iii.

Halticides.

Notozona elegans, fig. 4, *humilis*, fig. 5, *rufofusca*, fig. 6, *sparsa*, Clk., fig. 7, figured ; Waterh., Aid, pl. 167.

Podagrica, Foud., = (*Nisotra*, Baly) ; Weise, Ins. Deutsch. vi, p. 681.

Crepidodera frigida, Switzerland, Weise, Ins. Deutsch. vi, p. 696 ; *C. lewisi*, *recticollis*, p. 721, *levicollis*, *acuminata*, p. 722, *japonica*, *bimaculata*, p. 723, Jac., P. Z. S. 1885 : n. spp.

Derocrepis, n. g. for *Crepidodera rufipes* auct., *C. sodalis*, Duft., and *C. serbica*, Kutsch. ; Weise, Ins. Deutsch. vi, p. 686.

Pylladia, n. subg. of *Orestia* ; Weise, Ins. Deutsch. vi, p. 730.

Orestia apennina, Lucca, p. 733, *carniolica*, Carnolia, p. 734, Weise, Ins. Deutsch. vi, n. spp.

- Mantura japonica, fulvipes*, Japan, Jac., P. Z. S. 1885, p. 720, n. spp.
Liprus nigrinus, p. 724, *suturalis, minutus*, p. 725, Japan, Jac., P. Z. S. 1885, n. spp.
Haltica ignita, Ill., var. = (*inærata*, Lec.) ; Horn, P. Am. Ent. Soc. xiii, p. xiv.
Haltica latericosta, obscura, p. 726, *lewisi*, p. 727, Japan, Jac., P. Z. S. 1885, n. spp.
Disonycha (sub *Altica*) *caroliniana*, Fab., = (*punctigera*, Lec.) ; Horn, Tr. Am. Ent. Soc. xiii, p. 141. *D.* (sub *Altica*) *collata*, Fab., = (*melliecollis*, Say) ; *id. loc. cit.*
Lactica (sub *Altica*) *tibialis*, Ol., = (*accreata*, Say) ; *L.* (sub *Altica*) *iris*, Ol., = (*specularis*, Har.) ; Horn, Tr. Am. Ent. Soc. xiii, p. 141.
Lactica unicolor, Aden, Jac., Ann. Mus. Genov. (2) iv, p. 124, n. sp.
Longitarsus nitida, p. 727, *hemorrhoidalis, orientalis*, p. 728, *quadraticollis*, p. 729, Japan, Jac., P. Z. S. 1885, n. spp.
Plectroscelis pallidipes, Obock, Fairm., Ann. Soc. Ent. Fr. (6) v, p. 462, n. sp.
Halticotropis, n. g. of *Artipodites* (sic) for *H. multiplicata*, Madagascar, n. sp. ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 95.
Chaetocnema nebulosa, South Russia, p. 753, *rhombea*, Saxony and Syria, p. 768, Weise, Ins. Deutsch. vi ; *C. chaldeola*, p. 731, *japonica, fulvipes*, p. 732, *aurifrons*, p. 733, Japan, Jac., P. Z. S. 1885 : n. spp.
Exorhina, n. subg. for a portion of *Chaetocnema*, including *C. chlorophana*, auct. ; Weise, Ins. Deutsch. vi, p. 755.
Aphthona pryri and *pygmæa*, Baly, noticed ; Jac., P. Z. S. 1885, p. 730.
Aphthona foudrasi, p. 729, *semiviridis*, p. 730, Japan, Jac., P. Z. S. 1885, n. spp.
Trachytetra, n. g., near *Phyllotreta*, for *Phyllotreta rugulosa*, Broun ; Sharp, Tr. R. Dublin Soc. (2) iii.
Phyllotreta tenebrosa, Japan, Jac., P. Z. S. 1885, p. 731, n. sp.
Pleuraltica, n. g., affinities not given, for *Phyllotreta cyaneum*, Broun ; Sharp, Tr. R. Dublin Soc. (2) iii, p. 449 ; the insect figured, *t. c.* pl. xiii, fig. 25.
Licyllus, n. g., for *L. splendidus*, Australia, n. sp. ; Jac., P. Z. S. 1885, p. 928.
Batophila ærata, Marsh., = (*bertolinii*, Gredl.) ; Weise, Deutsche e. Z. xxx, p. 249.
Asphaera melanarthra, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 94, n. sp.
Edionychis: the following species are commented on or figured by Jacoby, Biol. Centr. Am. Col. vi (1) :—*icteridea*, p. 409, pl. xxiii, fig. 12, *extrema*, p. 412, *quadrilineata*, pl. xxiv, fig. 13, *virgata, chevrolati*, pl. xxiv, fig. 15, p. 414, *ornata*, pl. xxiv, fig. 16, p. 415, *circumcincta* ?, p. 416, *oculata* ?, pl. xxiv, fig. 6, p. 418, *seriata*, pl. xxiv, fig. 10, p. 419, *bipunctata*, p. 420, *godmani*, pl. xxiii, fig. 23, p. 421, *insepta*, p. 422, *decemgut-tata*, pl. xxiii, figs. 15, 18, & 22, p. 423, *duodecim-maculata*, pl. xxiii, fig. 16, p. 424, *salvini*, pl. xxiii, figs. 24 & 25, *transversalis*, pl. xxiv, fig. 17, p. 426, *biarcuata*, pl. xxiii, fig. 13, p. 428, *maculata*, pl. xxiv, fig. 9, p. 430, *querula*, pl. xxiii, fig. 19, p. 432. *Æ.* (sub *Altica*) *quercata*, Fab., = (*limbalis*, Melsh.) ; Horn, Tr. Am. Ent. Soc. xiii, p. 141.

Chelonychis cretica, Crete, Jac., S. E. Z. xlvii, p. 216; *Æ. atripes*, *diversipes*, Madagascar, Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 92; *Æ. acutangulus*, Mexico and Guatemala, p. 409, pl. xxiv, fig. 2, *frontalis*, Guatemala, pl. xxiii, fig. 14, *forreri*, *modesta*, p. 410, *semipurpurea*, *dugesii*, pl. xxiv, fig. 12, Mexico, *purulensis*, Guatemala, pl. xxiv, fig. 3, p. 411, *högei*, *lateralis*, Mexico, p. 412, *antennalis*, pl. xxiv, fig. 4, *limbatipennis*, pl. xxiv, fig. 1, *gemmata*, Panama, p. 413, *trilineata*, p. 416, *infirmata*, pl. xxiii, fig. 10, *inconspicua*, *longicollis*, pl. xxiv, fig. 20, p. 417, Panama, *sublineata*, Mexico to Panama, p. 418, *discoidea*, Panama, pl. xxiv, fig. 11, p. 419, *gracilis*, Mexico and Guatemala, pl. xxiv, fig. 14, p. 420, *illigeri*, Panama, pl. xxiii, fig. 21, p. 421, *fulvofasciata*, Guatemala, Nicaragua, p. 422, *exquisita*, pl. xxiv, fig. 5, p. 423, *brunneovittata*, p. 424, *panamensis*, pl. xxiii, fig. 17, *olivacea*, p. 425, Panama, *tenuicincta*, Mexico to Panama, pl. xxiv, fig. 22, p. 426, *championi*, Panama, pl. xxiv, fig. 18, *inscripta*, Mexico, pl. xxiv, fig. 21, *hypocrita*, Guatemala and Nicaragua, p. 427, *proxima*, Guatemala, pl. xxiv, fig. 19, p. 428, *imitans*, Panama, *brevicornis*, Mexico and Guatemala, p. 429, *atroguttata*, Mexico, p. 430, *signata*, *conspurcata*, pl. xxiv, fig. 8, Mexico and Guatemala, p. 431, *jansonii*, Nicaragua, pl. xxiv, fig. 24, p. 432, *hondurensis*, Brit. Hond., pl. xxiv, fig. 25, *violacco-marginata*, Mexico, p. 433, *montana*, *discolor*, Panama, *tibialis*, Costa Rica, p. 434, Jac., Biol. Centr. Am. Col. vi (1) : n. spp.

Allochroma, the following species are specially noticed or figured by Jacoby, Biol. Centr. Am. Col. vi (1) : *A. sexmaculatum*, pl. xxv, fig. 1-3, p. 436, *fasciatum*, fig. 4, *festivum*, fig. 7, p. 437, *balyi*, fig. 5, *bimaculatum*, fig. 6, p. 438, *sexsignatum*, fig. 9, p. 439, *coccineum*, fig. 14, p. 440.

Allochroma högei, Mexico, p. 438, *chiriquense*, Panama, pl. xxv, fig. 10, *godmani*, pl. xxv, figs. 12 & 13, p. 439, *mexicanum*, Mexico, pl. xxv, fig. 8, *biplagiatum*, pl. xxv, fig. 16, p. 440, *flavonotatum*, pl. xxv, fig. 15, *posticatum*, pl. xxv, fig. 11, p. 441, *castaneum*, pl. xxv, fig. 17, Panama, *guatemalense*, Guatemala, *intermedium*, Panama, p. 442, *semipunctatum*, *fulvoplagiatum*, Mexico, p. 443, *puncticolle*, Guatemala, *frontale*, Panama, *nigroplagiatum*, pl. xxv, fig. 18, Guatemala, p. 444, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Cerichrestus clarki, Panama, Jac., Biol. Centr. Am. Col. vi (1), p. 445, pl. xxvi, fig. 3, n. sp.

Omototus discoidalis, Panama, *albomaculatus*, Nicaragua and Panama, pl. xxvi, fig. 15, p. 446, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Idmosyne clarki, Nicaragua and Panama, pl. xxvi, fig. 8, *panamensis*, Panama, pl. xxvi, fig. 9, p. 447, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Octogonotes rufipennis, pl. xxvi, fig. 10, p. 448, *fulvomarginatus*, pl. xxvi, figs. 4, 11 & 12, p. 449, Panama, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Metriotes nigricollis, pl. xxvi, fig. 5, p. 449, *flavicollis*, *apicicornis*, pl. xxvi, fig. 6, Panama, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Sparnus chiriquensis, pl. xxvi, fig. 23, *apicalis*, fig. 24, Panama, *flavicollis*, fig. 25, Nicaragua, p. 451, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Zeteticus panamensis, Panama, pl. xxvi, fig. 7, p. 452, Jac., Biol. Centr. Am. Col. vi (1), n. sp.

Monoplatus fulvus, noticed, Jac., Biol. Centr. Am. Col. vi (1), p. 453. *M. quadraticollis*, Guatemala, *id. loc. cit.*, n. sp.

Rhoicus unifasciatus, pl. xxvi, fig. 2, *octomaculatus*, pl. xxvi, fig. 1, p. 454, Panama, *rogersi*, Costa Rica, p. 455, Jac., Biol. Centr. Am. Col. i (1), n. spp.

Rhinotmetus flavovittatus, p. 455, *albopilosus*, p. 456, *parvulus*, p. 457, Panama, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Tetragonotes oculata, Har., pl. xxv, figs. 21 & 22, *militans*, figs. 23, 24 & 25, noticed and figured, Jac., Biol. Centr. Am. Col. vi (1), p. 458: *vittata*, noticed, p. 459. *T. fasciaticollis*, Costa Rica, *id. loc. cit.* p. 458, n. sp.

Physimerus, characters of discussed; Jac., Biol. Centr. Am. Col. vi (1), p. 459.

Physimerus basalis, *obscuroplagiatus*, p. 460, *brunneus*, pl. xxxi, fig. 21, *maculicollis*, p. 461, *pygmaeus*, Panama, *zapotensis*, p. 462, *varicornis*, Guatemala, *constricticollis*, pl. xxvi, fig. 20, p. 463, *nigricornis*, *rubicunda*, p. 464, *P. ? nigripennis*, pl. xxvi, fig. 22, p. 465, Panama, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Thrasygæus, characters of, noticed, Jac., Biol. Centr. Am. Col. vi (1), p. 465; *T. scabrosus*, Clk., noticed and figured, *id. t. c.*, p. 467, pl. xxvi, figs. 18 & 19.

Thrasygæus salvini, Guatemala, *tibialis*, Panama, *cordovens*, Mexico, pl. xxvi, fig. 16, p. 466, *femoralis*, Guatemala, pl. xxvi, fig. 17, p. 467, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Eupeges, Clk., merged in *Thrasygæus*; Jac., Biol. Centr. Am. Col. vi (1).

Phylacticus major, Panama, pl. xxv, fig. 19, p. 468, Jac., Biol. Centr. Am. Col. vi (1), n. sp.

Ommamatus sericeus, Panama, Jac., Biol. Centr. Am. Col. vi (1), p. 469, n. sp. *O. nitidus*, Clk., noticed; *id. t. c.*

Omotyphus, Clk., characters discussed; Jac., Biol. Centr. Am. Col. vi (1) p. 470. *O. asper*, Clk., figured, pl. xxvi, fig. 13, = (*squalidus*, Clk.), p. 470; *id.*

Omotyphus tibialis, Guatemala, *maculipennis*, p. 471, *chiriquensis*, *semi-fasciatus*, pl. xxvi, fig. 14, p. 472, *bituberculatus*, *scutellatus*, p. 473, Panama, *varicornis*, Guatemala, p. 474, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Hylodromus basalis, Panama, Jac., Biol. Centr. Am. Col. vi (1) p. 475, n. sp.

Cleophes, n. g. (after *Hylodromus*), p. 475, for *C. unifasciata*, Panama, pl. xxv, fig. 20, p. 476, n. sp.; Jac., Biol. Centr. Am. Col. vi (1).

Hyphasis inconstans, Japan, Jac., P. Z. S. 1885, pl. xlvii, fig. 1, p. 733, n. sp.

Argopus nigripennis, *clarki*, Japan, Jac., P. Z. S. 1885, p. 734, n. spp.

Sphero derma fuscicornis and *japana*, Baly, vars. of, noticed; Jac., P. Z. S. 1885, pp. 735 & 737.

Sphero derma balyi, *atra*, p. 735, *abdominalis*, *unicolor*, p. 736, *nigricollis*, p. 737, Japan, Jac., P. Z. S. 1885, n. spp.

Argopistes, Motsch., the structural characters of; Jac., P. Z. S. 1885, p. 738.

Argopistes unicolor, *undecimmaculata*, Japan, Jac., P. Z. S. 1885, p. 738, n. spp.

Psylliodes subrugosa, *intermedia*, p. 739, *japonica*, p. 740, Japan, Jac., P. Z. S. 1885, n. spp.

Enneamera tibialis, Japan, Jac., P. Z. S. 1885, p. 740, n. sp.

Manobia lewisi, Japan, Jac., P. Z. S. 1885, p. 741, n. sp.

Aphonoides beccarii recorded from Japan, and figured; Jac., P. Z. S. 1885, p. 741, pl. xlv, fig. 2.

Galerucides.

Oides biplagiata, Jac., p. 46, *ornatipennis*, Duv., p. 48, *ornatum*, Baly, p. 49, notes on; Jac., P. Z. S. 1885.

Oides quadrifasciata, New Guinea, p. 41, *quiquelineata*, New Guinea and Australia, p. 42, *maculicollis*, Sumatra, *cyarella*, Ternate, p. 43, *subanea*, p. 44, *perplexa*, *terminata*, p. 45, *decemguttata*, p. 46, *nigroplagiata*, p. 47, *nigricollis*, p. 48, New Guinea, Jac., Ann. Mus. Genov. (2) iv, n. spp.

Aulacophora austrocaledonica, Montr., p. 53, *rubrozonata*, Blanch., p. 55, *affinis*, Montr., p. 57, notes on; Jac., Ann. Mus. Genov. (2) iv.

Baly tabulates and describes many known species of *Aulacophora*, J. L. S. xx, pp. 1-27, including the following n. spp.:—

Aulacophora albofasciata, p. 6, *pygidialis*, p. 7, New Guinea, *lata*, p. 8, Ceram, &c., *instabilis*, Batchian, *boisduvali*, Malay Arch., p. 10, *propinqua*, New Guinea, p. 11, *approximata*, Celebes, p. 12, *flaviventris*, Malay Penins., p. 13, *fabricii*, Tonga Is., *nigroscutata*, Gilolo, p. 14, *wallacii*, Timor, p. 15, *tetraspilota*, Batchian, *octomaculata*, N. India, p. 17, *excavata*, p. 18, *downesii*, p. 19, India, *antennata*, Java, &c., p. 21, *stevensi*, Ceylon, *duboulayi*, W. Australia, p. 22, *nigrosignata*, Flores, p. 23, *lewisii*, China, *semilimbata*, New Guinea, *duvivieri*, Java, Malacca, p. 24, *excisa*, Celebes, *mouhoti*, Cochin China, p. 25, *costatipennis*, hab. ?, p. 26, Baly, J. L. S. xx: *A. dilatata*, Borneo, p. 49, *pectoralis*, Australia, p. 50, *semiopaca*, Sumatra, p. 51, *celebensis*, Celebes, *fraudulenta*, p. 52, *apicalis*, p. 54, *insularis*, p. 55, New Guinea, *basalis*, p. 56, Elephantia, Jac., Ann. Mus. Genov. (2) iv: n. spp.

Pseudocophora brunnea, Celebes, Baly, J. L. S. xx, p. 26, n. sp.

Paridea, n. g. near *Aulacophora*, p. 26, for *P. thoracica*, India, n. sp., p. 27, Baly, J. L. S. xx.

Diacantha oberthuri, p. 928, *viridipennis*, p. 929, Africa trop., Jac., P. Z. S. 1885, n. spp.

Phyllobrotica javana, Java, p. 57, *bifasciata*, New Guinea, p. 18, Jac., Ann. Mus. Genov. (2) iv; *P. nigrita*, Japan, Jac., P. Z. S. 1885, p. 742, pl. xlv, fig. 3; *P. frontalis*, Asia Minor, Weise, Ins. Deutsch. vi, p. 587: n. spp.

Auchenia thalassina, Fald., noticed and referred to *Galerucella*, = (*G. venescens*, Fairm.); Heyd., Deutsche e. Z. xxx, p. 288.

Diabrotica fuscomaculata, Jac., = (*ornatula*, Baly); Baly, J. L. S. xix, p. 258.

Diabrotica kirschi, *theimei*, p. 231, *separata*, p. 232, *coryphæa*, p. 233, *anceipennis*, *flavo-marginata*, p. 234, *flavocincta*, *similata*, p. 235, *incerta*,

p. 236, *perplexa*, *mediovittata*, p. 237, *abbreviata*, *puella*, p. 238, *steinheili*, p. 240, *spectanda*, p. 241, *spiloptera*, *nigrovittulata*, p. 242, *nigroguttata*, *piceolineata*, p. 243, *alternata*, *beata*, p. 244, *jekelii*, p. 246, *bella*, p. 247, *clypeata*, p. 249, *xanthoptera*, *fenestrata*, p. 250, *deliciosa*, *butleri*, p. 251, *intermedia*, *posticata*, p. 252, *lugubris* (Dej., MS.), *leucospila*, p. 253, *tetraspilota*, p. 254, *propinqua*, *robusta*, *serraticornis*, p. 255, *insignita*, p. 256, *bivatticollis*, *letabilis*, p. 257, *klugii*, p. 258, Colombia, Baly, J. L. S. xix ; *D. viridana*, Chili, *graminea*, Porto Rico, p. 443, *latevittata*, Amazons, *apicalis*, Guatemala, p. 444, *grayella*, Brazil, *interrupta*, Amazons, *duvivieri*, Mexico, p. 445, *amplicornis*, Brazil, *flavovittata*, Yucatan, p. 446, *fairmairei*, Mexico, *consimilis*, Ecuador, p. 447, *cornuta*, Peru, Guatemala, p. 448, *curtsii*, Mexico, *cinctipennis*, Peru, p. 449, *gibbosa*, *rugulosa*, p. 450, *dimidiaticornis*, Ecuador, *lata*, Peru, *nigrocincta*, Teapa, p. 451, *oberthuri*, Guatemala, *paraensis*, Amazons, p. 452, *albosignata*, Guatemala, *piceicollis*, Amazons, p. 453, *setosa*, Teapa ?, *vittatipennis*, p. 454, *melanocephala*, Ecuador, p. 455, Baly, Tr. Ent. Soc. 1886 : n. spp.

Agelastica, auct., = (*Synodita*, Chap.), and *A. humeralis*, Baly, = (*S. borrei*, Chap.) ; Jac., Ann. Mus. Genov. (2) iv, p. 59.

Agelastica flavicollis, Australia, Jac., Ann. Mus. Genov. (2) iv, p. 59, n. sp.

Megalognatha abyssinica, p. 126, *metallica*, p. 127, Abyssinia, Jac., Ann. Mus. Genov. (2) iv, n. spp.

Morphosphera sumatrana, Sumatra, Jac., Ann. Mus. Genov. (2) iv, p. 60, n. sp.

Hoplasoma celebensis, Celebes, p. 81, *ceylonensis*, Ceylon, p. 82, Jac., Ann. Mus. Genov. (2) iv, n. spp. *H. ventralis*, Borneo, *ornata*, Mysol ; Baly, Tr. Ent. Soc. 1886, p. 27.

Nacreia, n. g., near *Agetocera*, for *N. apicipennis*, India, *maculata*, Java, n. spp., Baly, Tr. Ent. Soc. 1886, p. 29.

Mimastra, Baly, = (*Anthraxantha*, Fairm.) ; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 356. *M. cyanura*, Hope, = (*Anthraxantha davidis*, Fairm.) ; *id. ibid.*

Mimastra rugosa, Java, *semimarginata*, Sumatra, p. 108, Jac., Ann. Mus. Genov. (2) iv ; *M. apicalis*, India, Baly, Tr. Ent. Soc. 1886, p. 28 : n. spp.

Hemistus, n. g. (*Mimastrinarum*), for *H. submetallicus*, Borneo, n. sp. ; Jac., Ann. Mus. Genov. (2) iv, p. 90.

Cerophysa flava, Burmah, Baly, Tr. Ent. Soc. 1886, p. 28, n. sp.

Cneorane modesta, Malay Archipelago, p. 60, *C. ? semipurpurea*, New Guinea, p. 61, Jac., Ann. Mus. Genov. (2) iv, n. spp.

Cneoraus (sic) *rugulipennis*, North India, Baly, Tr. Ent. Soc. 1886, p. 27, n. sp.

Metellus, n. n., to replace *Neocharis*, Jac., with *M. laevipennis*, Sumatra, n. sp. ; Jac., Ann. Mus. Genov. (2) iv, p. 62.

Luperus = (*Adoxia*, Broun) ; Sharp, Tr. R. Dublin Soc. (2) iii, p. 449.

L. viridipennis var. *caucasicus*, Weise, redescribed as distinct species, *caucasicus* ; Weise, Ins. Deutsch. vi, p. 599.

Luperus setulosus, Oran, p. 592, *lydius*, Smyrna, p. 594, *rugifrons*, Hungary, p. 595, Weise, Ins. Deutsch. vi ; *L. hirsutus*, pl. xlv, fig. 4, *longicornis*, fig. 5, Japan, Jac., P. Z. S. 1885, p. 742 ; *L. australis*, Austr-

lia, p. 63, *nigripennis*, Sumatra, p. 64, *piceo-marginatus*, Australia, p. 65, Jac., Ann. Mus. Genov. (2) iv; *L. nigricornis*, p. 449, *ænescens*, *puncticollis*, p. 450, New Zealand, Sharp, Tr. R. Dublin Soc. (2) iii : n. spp.

Luperodes nigripennis, Motsch., noticed; Jac., P. Z. S. 1885, p. 743.

Luperodes limbella, Singapore, *jacobyi*, Mysol, *marginata*, Sumatra, Baly, Tr. Ent. Soc. 1886, p. 30, n. spp.

Euluperus, n. g., for *Cricocoris* (*Luperus*) *xanthopus*, Duft., and *L. cyaneus*, Joan; Weise, Ins. Deutsch. vi, p. 662.

Microlepta, n. g., p. 65, near *Luperus*, for *M. cæruleipennis*, New Guinea, p. 66, *celebensis*, Celebes, p. 67, n. spp.; Jac., Ann. Mus. Genov. (2) iv.

Nadrana bella, Malacca, Baly, Tr. Ent. Soc. 1886, p. 31, n. sp.

Atysa nitidicollis, Ké, *jansoni*, New Guinea, *sulcicollis*, Malay Arch., p. 32, *fulvicornis*, Waigiou, *funesta*, New Guinea, p. 33, Baly, Tr. Ent. Soc. 1886, n. spp.

Monoxia viridis, Jac., referred to *Nestinus*; Jac., Biol. Centr. Am. Col. vi (1) p. 484.

Neodrana, n. g., p. 82, near *Nadrana*, for *N. semifulva*, New Guinea, n. sp., p. 83; Jac., Ann. Mus. Genov. (2) iv.

Trirrhabda variabilis, pl. xxviii, figs. 16 & 17, *ænea*, p. 485, *trifasciata*, Mexico, *obscuro-vittata*, pl. xxvii, fig. 22, Brit. Hond. to Panama, p. 486, *mexicana*, Mexico, pl. xxvii, fig. 21, p. 487, *dilatipennis*, Panama, T. (?) *modesta*, pl. xxvii, fig. 20, p. 487, *foveicollis*, pl. xxvii, fig. 23, p. 488, Mexico, Jac., Biol. Centr. Am., n. spp.

Galerucella, characters of, noticed; Jac., Biol. Centr. Am. vi (1), p. 488. *G. notuluta* and *notata* discussed; *id.* p. 489. *G. nymphaea*, L., metamorphoses; Gad. de K., Ann. Soc. Ent. Fr. (6) v, pp. 427-430.

Galerucella alternata, Mexico to Panama, p. 489, *lineatipennis*, (G. ?) *transversicollis*, pl. xxviii, fig. 1, p. 490, Panama, *fuscomaculata*, Mexico to Panama, pl. xxviii, fig. 2, *marmorata*, pl. xxviii, fig. 3, Mexico and Guatemala, p. 491, *godmani*, Guatemala, pl. xxviii, fig. 4, p. 492, Jac., Biol. Centr. Am.; *G. thoracica*, Aru Is., &c., p. 33, *wallacei*, New Guinea, p. 34, Baly, Tr. Ent. Soc. 1886; *G. laterimaculata*, New Guinea, p. 105, *multimaculata*, Sumatra, p. 106, Jac., Ann. Mus. Genov. (2) iv; *G. nigromarginata*, pl. xli, fig. 10, p. 743, *seminigra*, *viridipennis*, fig. 9, p. 744, *semifulva*, fig. 11, *modesta*, p. 745, *fuscipennis*, p. 746, Japan, Jac., P. Z. S. 1885 : n. spp.

Pallasia, n. g., for *Pall. absinthii*, Pall., and ? *Galleruca violacea*, Luc.; Weise, Ins. Deutsch. vi, p. 577.

Leptosonyx, n. g., to include *L. silphoides*, Sahl., *costipennis*, Kirsch, *nigrolineatus*, Man., and *L. hirtus*, Weise; Weise, Ins. Deutsch. vi, p. 576.

Diorhabda (?) *yulensis*, New Guinea, p. 107, Jac., Ann. Mus. Genov. (2) iv; *D. (?) maculiceps*, Abyssinia, *id. t. c.* p. 124 : n. spp.

Ophraea, n. g., p. 492, near *Galerucella*, for *O. subcostata*, pl. xxviii, fig. 5, Mexico and Guatemala, *rugosa*, pl. xxviii, fig. 6, Mexico and Costa Rica, p. 493, *ænea*, pl. xxviii, fig. 7, *metallica*, pl. xxviii, fig. 8, p. 494, *melancholica*, pl. xxviii, fig. 9, *minor*, Mexico, *elongata*, Mexico and Guatemala, p. 495, Jac., Biol. Centr. Am. Col. vi (1), n. spp.

Monocesta: Jacoby notices and figures *M. ducalis*, pl. xxvii, fig. 1, p. 477, *depressa*, pl. xxvii, figs. 3 & 4, p. 478; Biol. Centr. Am. Col. vi (1).

Monocesta jansoni, Nicaragua, pl. xxvii, fig. 2, p. 477, *clarki*, Mexico, pl. xxvii, fig. 6, *pallida*, Nicaragua and Panama, pl. xxvii, fig. 5, p. 478, *cyaneo-maculata*, Mexico, pl. xxvii, fig. 7, p. 479, Jac., Biol. Centr. Am. Col., n. spp.

Celomera: Jacoby figures *C. nigricollis*, pl. xxvii, fig. 8, *godmani*, fig. 10, *atro-cærulea*, fig. 12; Biol. Centr. Am. Col. vi (1).

Celomera olivieri, Guatemala, pl. xxvii, fig. 9, *punctaticollis*, Panama, pl. xxvii, fig. 11, p. 481, Jac., Biol. Centr. Am. Col., n. spp.

Coraila maculicollis, figured and noticed; Jac., Biol. Centr. Am. Col. vi (1), pl. xxvii, fig. 13, p. 482.

Coraila clarki, Mexico, pl. xxvii, figs. 18 & 19, p. 482, Jac., Biol. Centr. Am. Col. vi (1), n. sp.

Nestinus bimaculatus, Clk., figured, pl. xxvii, fig. 15, Jac., Biol. Centr. Am. Col. vi (1). *N. auriquadrum*, Mexico, pl. xxvii, fig. 14, p. 483, *id. t. c.*, n. sp.

Sastra discoidalis, Borneo, Baly, Tr. Ent. Soc. 1886, p. 35; *S. placida*, New Guinea, p. 70, *rugosa*, Sumatra, p. 71, *basalis*, p. 72, *metallica*, *costa-tipennis*, p. 73, *S. ? flavomarginata*, p. 74, New Guinea, *suturalis*, Australia, p. 75, *beccarii*, p. 76, *fasciata*, p. 77, New Guinea, Jac., Ann. Mus. Genov. (2) iv : n. spp.

Prasyptera wallacii and *ornata*, Baly, note on; Jac., Ann. Mus. Genov. (2) iv, p. 81.

Prasyptera unifasciata, p. 77, *antennata*, p. 78, *dubiosa*, p. 79, *nigripes*, *clypeata*, New Guinea, Jac., Ann. Mus. Genov. (2) iv, n. spp. [*Cf.* also p. 193.]

Prasyptera nitidipennis, Mysol, Baly, Tr. Ent. Soc. 1886, p. 31, n. sp.

Nicea bifasciata, p. 67, *basalis*, p. 68, New Guinea, Jac., Ann. Mus. Genov. (2) iv; *N. pulchella*, Dorey, Baly, Tr. Ent. Soc. 1886, p. 35 : n. spp.

Pachytoma abyssinica, Abyssinia, Jac., Ann. Mus. Genov. (2) iv, p. 125, n. sp.

Momæa flavomarginata, p. 69, New Guinea, Jac., Ann. Mus. Genov. (2) iv, n. sp.

Eumæa fasciata, Dorey, *albo-fasciata*, Mysol, p. 36, *apicipennis*, New Guinea, *flavipennis*, Menado, p. 37, Baly, Tr. Ent. Soc. 1886, n. spp.

Adimonia rustica, Ill., metamorphoses Vasvary, Rov. Lapok iii, p. 137, figs.; *A. tanacetii*, L., larva noticed, Kew., Ent. M. M. xxiii, p. 107.

Galeruca vittaticollis, Baly, supplementary description; Jac., P. Z. S. 1885, p. 745.

Galeruca (Adimonia) multicostata, Japan, Jac., P. Z. S. 1885, pl. xlvii, fig. 7, p. 746, n. sp.

Strumatea, n. g. allied to *Galeruca*, for *S. nodosa*, Sarawak, n. sp.; Baly, Tr. Ent. Soc. 1886, p. 34.

Malaconida, n. g. near *Adimonia* and *Buphonida*, for *M. indecora*, Madagascar; Fairm., Ann. Soc. Ent. Fr. (6) vi, p. 94.

Lochmæa suturalis, Th., habits noticed; Deutsche z. Z. xxx, p. 249.

Menippus metallicus, Celebes, Baly, Tr. Ent. Soc. 1886, p. 37; *M. nigrocærulea*, New Guinea, Jac., Ann. Mus. Genov. (2) iv, p. 114 : n. spp.

Buphonida puncticollis, Batchian, *submarginata*, Mysol, *placida*, Sarawak, Baly, Tr. Ent. Soc. 1886, p. 38, n. spp.

Haplosonyx quadriplagiata, Java, Baly, Tr. Ent. Soc. 1886, p. 39 ; *H. apicicornis*, Java, p. 83, *parvulus*, Borneo, p. 84, Jac., Ann. Mus. Genov. (2) iv : n. spp.

Arthrotus, Motsch., good generic characters given for first time ; Jac., P. Z. S. 1885, p. 750.

Syophia, n. g. (*Luperinarum*), for *S. javanensis*, Java, n. sp. ; Jac., Ann. Mus. Genov. (2) iv, p. 85.

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Sphecodes bonaërens, Bahia Blanca, Holm., Act. Ac. Cordob. v, p. 182, pl. iv, fig. 31, n. sp.

Halictoides calcaratus, Thibet, Mor., Hor. Ent. Ross. xx, p. 213, n. sp.

Hyleus albitarsis, p. 226, *przewalskyi*, p. 227, Thibet, Mor., Hor. Ent. Ross. xx, n. spp.

Prosopis, the Hawaiian species tabulated, p. 148, amended descriptions given of *blackburni*, p. 141, *facilis*, p. 143, *flavifrons*, p. 144, *hilaris*, p. 147;

Blackn., P. Manch. Soc. xxv. *P. satellus*, p. 140, *kona*, p. 144, *coniceps*, p. 145, *rugiventris*, p. 146, Hawaiian Islands, Blackn., *t. c.*, n. spp.

Colletes askhabadensis, Central Asia, Rad., Hor. Ent. Ross. xx, p. 23;
C. furfuracea, Bahia Blanca, Holm., Act. Ac. Cordob. v, p. 183, pl. iv, fig. 32 : n. spp.

VESPIDÆ.

Vespa vulgaris and *germanica*, paper of nests of ; Dowker, Tr. E. Kent. Soc. (2), pp. 54-56. *V. crabro* : tarsal hairs and glands ; Dahl (133), p. 255, pl. xii, figs. 18, 19, & 20.

Polistes macaensis, var. from Tahiti described ; Cam., P. N. H. Soc. Glas. (n.s.) i, p. 263.

Paravespa, n. g., p. 46, for *P. komarowii*, Central Asia, n. sp., p. 47, fig. 48 ; Rad., Hor. Ent. Ross. xx.

Synagris micelii (Grib.), *rubiginosus*, p. 873, *hyalinipennis* hab. ?, *medana* (Grib.), Tunis, p. 874, André, Spec. Hym. ii, n. spp.

Odynerus murarius, L. Nests, habits, and metamorphoses ; Auriv., Bih. Sv. Ak. Handl. xii, 4 & 5, p. 6. *O. dromedarius*, p. 151, *vulcanus*, p. 152, *hawaiiensis*, p. 153, *haleakalæ*, p. 154, *blackburni* (Kirb.), p. 156, *cardinalis*, p. 158, *pacificus*, *rubropustulatus*, p. 159, *obscure-punctatus*, p. 160, *diversus*, p. 161, *insulicola*, p. 163, Hawaiian Islands, Blackn., P. Manch. Soc. xxv ; *O. punicus* (Grib.), hab. ?, André, Spec. Hym. ii, p. 874 ; *O. rotundiventris* var. *tunetanus*, *id. t. c.* p. 875 ; *O. (Leionotus) askhabadensis*, p. 47, *kokpeticus*, p. 48, *vagus*, p. 49, Central Asia, Rad., Hor. Ent. Ross. xx : n. spp.

Lionotus pubescens, Thoms. Nests, habits, and metamorphoses ; Auriv., Bih. Sv. Ak. Handl. xii, 4 & 5, p. 3.

Ancistrocerus oviventris, Th., and *parietum*, note on ; Auriv., Bih. Sv. Ak. Handl. xii, 4 & 5, p. 12.

Pterochilus gigas, Central Asia, Rad., Hor. Ent. Ross. xx, p. 50, n. sp.

CRABRONIDÆ.

Bembicides.

Stizus ruficornis, habits, Fabre, Souvenirs, iii, p. 249.

Larrides.

Tachyta sp. characterised as *T. manticide*, p. 229, its habits, &c. ; Fabre, Souvenirs, iii, p. 225, *et seq.*

Tachytes caucasicus, p. 30, *montanus*, *dubius*, p. 31, Caucasus, *pulverosus*, Samarcand, p. 32, Rad., Hor. Ent. Ross. xx, n. spp.

Crabronides.

Crabro curvitarus, H. S., description and figs. ; Kohl, Hernstein Fauna, pp. 644 & 645.

Crabro : revision of the Hawaiian species ; Blackn., P. Manch. Soc. xxv, pp. 165-172.

C. mauiensis, p. 165, *abnormis*, p. 168, *adspectans*, p. 170, *rubro-caudatus*, p. 172, Hawaiian Islands, Blackn., P. Manch. Soc. xxv, n. spp.

Komarowia, n. g., p. 43, near *Meria*, for *K. victoriosa*, Askhabad, n. sp., p. 44, fig. 44; Rad., Hor. Ent. Ross. xx.

Lestiphorus asiaticus, Central Asia, Rad., Hor. Ent. Ross. xx, p. 36, n. sp.

Fedtschenkia indigotea, Central Asia, Rad., Hor. Ent. Ross. xx, p. 45, n. sp.

Sphegides and *Philanthides*.

Sphégiens les : [cf. André (7)], commencement of monograph of the European and N. African; general observations, structure, habits, biology, and commencement of systematic tables and descriptions.

Ammophila touareg, Algeria, p. 65, *iberica*, Portugal, p. 69, *lævicollis*, S. France, Spain, p. 77, André, Spec. Hym. ii, n. spp.

Pelopæus cœmentarius form from Nuka Hiva Island; Cameron, P. N. H. Soc. Glasg. (n.s.) i, p. 264.

P. transcasicus, Central Asia, Rad., Hor. Ent. Ross. xx, p. 24, n. sp.

Ceratocolus loewi, Dahlb., description and figures of; Kohl, Hernstein Fauna, pp. 665 & 666.

Sphex paludosa destroying *Stauronotus maroccanus*; Ann. Soc. Esp. xv, pp. 74 & 75.

S. plumipes, Central Asia, Rad., Hor. Ent. Ross. xx, p. 25, n. sp.

Cerceris komarovii, p. 35, *spectabilis*, p. 36, Central Asia, Rad., Hor. Ent. Ross. xx, n. spp.

Pompilides.

Pompilus divisus, Sm., figured; Waterh., Aid, pl. 169, fig. 2. *P. concinus*, Dahlb. (? *melanarius*, Lind.), *venustus*, Wesm., described at length; Auriv., Ent. Tidskr. 1886, pp. 163-165.

P. costæ, p. 403, *longobardicus*, *magretti*, p. 404, Lombardy, Magr., Bull. Ent. Ital. 1886; *P. discernendus*, Piedmont, Costa, Rend. Acc. Nap. xxv, p. 282; *P. bruiginicollis* (sic), Sardinia, *id. t. c.* p. 53; *P. cliens*, Sicily, p. 317, *esau*, Spain, p. 319, *silvanus*, Marseilles, p. 319, *temporalis*, Algeria, p. 320, *rytiphorus*, Dalmatia, *rhodosoma*, Cairo, p. 321, *atrohirtus*, Syria, *platyacanthus*, Cairo, p. 322, *magrettii*, Mediterranean Region, p. 323, *quadriscoposus*, Europe, *triscoposus*, Sardinia, p. 324, *sagax*, Algeria, p. 325, *orchesticus*, Tangier, *denticulatus*, Egypt, p. 326, *colpostana*, Switzerland, *caffer*, Caffraria, p. 327, *pseudocaffer*, *cedipus*, Cape G. H., p. 328, *spectrum*, p. 329, *apatelus*, Australia, *microcephalus*, Amboyna, p. 330, *opimus*, Australia, p. 331, *pollens*, Tasmania, p. 332, *pachycerus*, *ahasuerus*, p. 333, Australia, *tristis*, Brazil, *pygidialis*, America, p. 334, *uruguaiensis*, Uruguay, p. 335, *teniatus*, *macronotum*, p. 336, Mexico, *pachylopus*, Chili, p. 337, *pictus*, Mexico, p. 338, *spilopterus*, Brazil, p. 339, Kohl, Verh. z.-b. Wien, xxxvi; *P. militaris*, Central Asia, Rad., Hor. Ent. Ross. xx, p. 27 : n. spp.

Pluniceps, Latr., merged in *Pompilus*; Kohl, Verh. z.-b. Wien, xxxvi, p. 309.

Epipompilus maximiliani, Kohl, described; Verh. z.-b. Wien, xxxvi, p. 340.

Callicurgus machetes, idoneus, Brazil, p. 342, *rhodogaster*, Mexico, p. 343, Kohl, Verh. z.-b. Wien, xxxvi, n. spp.

Notocyphus melanosoma, macrostoma, Brazil, p. 341, Kohl, Verh. z.-b. Wien, xxxvi, n. spp.

Agenia, the British species discussed; *A. hircana*, Fab., = (*bifasciata*, Shuck., Sm.): Saund., Ent. M. M. xxiii, p. 94.

A. (Pogonius) neotropica, Rio de Janeiro, Kohl, Verh. z.-b. Wien, xxxvi, p. 343, n. sp.

Pogonius subintermedius, Lombardy, Magr., Bull. Ent. Ital. 1886, p. 403, n. sp.

Prionemism rufozonatus, bisignatus, Italy, Costa, Rend. Acc. Nap. xxv, p. 282, n. spp.

Salix micans. Rad., ♂ described; Rad., Hor. Ent. Ross. xx, p. 26.

S. dimidiatipennis, Italy, Costa, Atti Ist. Nap. (3) v, p. 7, = (*P. bicolor* and *P. luteipennis*, Cast., olim.), n. sp.

Ceropales nigripes, Piedmont, Costa, Rend. Acc. Nap. xxv, p. 282; *C. intermedia*, Lombardy, Magr., Bull. Ent. Ital. 1886, p. 402; *C. komarowii*, Central Asia, Rad., Hor. Ent. Ross. xx, p. 27 : n. spp.

Euagetus dubius, Lind., described; Auriv., Ent. Tidskr. 1886, p. 166.

Ferreola, n. sp.?, Sweden, Auriv., Ent. Tidskr. 1886, p. 168.

Scoliides.

Scolia bifasciata, interrupta, &c., habits, &c.; Fabre, (173) chaps. i-iv.

Meria and *Myzine*: synonymy of the Mediterranean species of, pp. 37-41; *Meria ashkhabadensis*, p. 40, n. sp.; Rad., Hor. Ent. Ross. xx.

Sapygides.

Sapygina, n. g. for *Sapyga 10-guttata*, Jur.; Costa, Rend. Acc. Nap. xxv, p. 282.

Sapyga similis, Fab., described at length, with synonymy; Auriv., Ent. Tidskr. 1886, p. 161. *S. punctata*, dimorphism of larva; Fabre, Souvenirs, iii, pp. 218 & 219.

MUTILLIDÆ.

Mutilla europæa, biology of; Hoffer (294). *M. aurifex*, figs. 4 & 5, *rufitarsis*, Sm., fig. 6, figured; Waterh., Aid, pl. 169.

M. trisinuosa, Italy, Costa, Rend. Acc. Nap. xxv, p. 283; *M. eximia*, Arizona, p. 200, *thoracica*, New York, p. 204, *parvula*, Alabama, p. 206, Blake, Tr. Am. Ent. Soc. xiii : n. spp.

Sphærophthalma parmosa, venifica, California, p. 210, *thetis*, Arizona, p. 214, *mollissima*, Colorado, p. 215, *hispida*, Colorado, p. 226, *macer*, Kentucky, p. 227, *luteola*, Utah, p. 235, *præclara*, Arizona, p. 252, *virguncula*, New Mexico, p. 253, Blake, Tr. Am. Ent. Soc. xiii, n. spp.

Photopsis, n. n. to replace *Agama*; Blake, Tr. Am. Ent. Soc. xiii, p. 179. *P. mellipes*, p. 262, *melaniceps*, p. 264, Arizona, *sobrinus*, p. 268, *lepidus*, p. 269, Colorado, *venustus*, Arizona, p. 270, *inconspicuus*, California, p. 272, *nebulosus*, California, *abdominalis*, Colorado, p. 275, Blake, Tr. Am. Ent. Soc. xiii : n. spp.

Chyphotes, n. g. for *C. elevatus*, n. sp., Arizona; Blake, Tr. Am. Ent. Soc. xiii, p. 276.

FORMICIDÆ.

Ants attending on *Coccidæ*; Ent. M. M. xxiii, p. 18. Relations of Ants and Ants'-nest beetles; Wasman (722).

Camponotides.

Camponotidæ: the subfamily reclassified; Forel, Ann. Ent. Belg. xxx, pp. 212 & 213.

Camponotus ligniperdus, formation of nest; Blochmann (59): enmities of; Forel, Ann. Ent. Belg. xxx, p. 137. *C. lateralis*, Ol., mimicry; Emery (170). *C. fulvopilosus*, de G., *foraminosus*, Forel, notes on; Emery, Bull. Soc. Ent. Ital. xviii, p. 358. *C. atriceps*, fungus growing on; Ann. N. H. (5) xviii, p. 317, woodcut. *C. angusticeps*, p. 355, *mystaceus*, p. 356, *C. Good Hope*, *detritus*, Damara land, p. 357, *emarginatus*, *C. Good Hope*, p. 358, Emery, Bull. Soc. Ent. Ital. xviii, n. spp. *C. gestroi*, Emery, st., *creticus*, Crete, n. st., p. clix; *C. kiesewetteri*, sexes described, p. clx; *C. sylvaticus* var. *dichrous*, Crete, p. clxi; Forel, C.R. ent. Belg. 1886. *C. ursus*, p. ci, *quadrimaculatus*, p. cii, *grandidieri*, p. ciii, *radovæ*, p. civ, n. spp., *niveosetosus*, Mayr, race *madagascariensis* n. st., *egregius*, Sm. race *gouldi*, n. st., p. civ, Madagascar, Forel, C.R. ent. Belg. 1886. *C. sexguttatus*, Fab., *exiguoguttatus*, Assam, Forel, J. A. S. B. lv, p. 239, n. subsp. *C. castaneus* and *herculeanus*, note on, p. 141; *C. marginatus*, n. var., *quadrinotatus*, Japan, p. 142; *C. rubripes*, Drury, its races discussed, pp. 143-160, with *solon*, Benguela, p. 152, *odiosus*, Sumatra, p. 154, *brutus*, Congo, p. 155, *pompeius*, Gaboon, p. 157, *hagensii*, Madagascar, p. 158, n. stt., *longipes*, Gerst., workers described, p. 164, *egregius*, Sm., discussed, p. 166, *kubaryi*, Mayr, n. st., *futius*, Sumatra, p. 168, *sexguttatus*, Fab., n. st., *lespesii*, p. 169, *pallidus*, Sm., *gilviceps*, Rog., p. 171, and *fastigiatus*, Rog., p. 172, noticed, *punctulatus*, Mayr, n. st., *minutior*, Argentine Republic, p. 173, *eugenia*, Forel, given specific rank, p. 174, *foraminosus*, Forel, n. stt., *olivieri*, p. 175, *lemna*, p. 166, *perrisii*, p. 177, Angola, *radovæ*, Forel, workers described, p. 178, *inflatus*, Lub., redescribed, p. 181, *mayri*, p. 191, and *sericeus*, Fab., p. 192, noticed: *druryi*, Zanzibar, p. 160, *hildebrandti*, Madagascar, p. 161, *cæsar*, Angola, p. 162, *autrani*, Sumatra, p. 165, *leydigi*, Brazil, p. 169, *linncei*, = (*angulatus*, Mayr, nec Sm.), *darwini*, Madagascar, p. 179, *mombassæ*, Zanzibar Coast, p. 180, *buchneri*, Angola, p. 183, *christi*, with n. st. *færsteri*, p. 185, *lubbocki*, *kelleri*, p. 186, Madagascar, *dewitzii*, Congo, p. 187, *meinerti*, Angola, p. 189, n. spp.; Forel, Ann. Ent. Belg. xxx.

Polyrhachis abdominalis and *phyllophila*, Sm., are one species; *P. rugosus* is a *Dolichoderus*; the position of other species noticed: Mayr, Verh. z.-b. Wien, xxxvi, p. 357. *P. furcata*, Sm., description augmented, p. 241, *mayrei* subsp. *intermedia*, *levisima* (sic), Sm., n. var. *dichrous*, p. 242, and Indian species of the genus noticed, pp. 241-243; Forel, J. A. S. B. lv. *P. gagates*, Sm., ♀ described, p. 194, *militaris*, Fab., note on, p. 194, with n. st. *schluteri*, East Africa, p. 195, *laboriosus*, Sm., noticed, p. 195, *orsyllus*, Sm., n. st. *halmahera*, Gilolo, p. 196, *thrinax*, Rog., n. st. *saigonensis*, Cochin China, p. 199, *gerstaeckeri*, Zanzibar, p. 197, *schenkii*, Darnley Island, p. 198, n. spp., Forel, Ann. Ent. Belg. xxx.

Rhinomyrmex, n. g., near *Camponotus*, p. 192, for *R. klaesii*, Sumatra, n. sp., p. 193; Forel, Ann. Ent. Belg. xxx.

Cecophylla smaragdina, Fab., ♂ described; Forel, Ann. Ent. Belg. xxx, p. 199.

Dolichoderus pustulatus, N. America, Mayr, Verh. z.-b. Wien, xxxvi, p. 436; *D. moggridgei*, Assam, Forel, J. A. S. B. lv, p. 243 : n. spp.

Prenolepis longicornis, Latr., noticed, p. 210, *nodifera*, Mayr, n. st. *bourbonica*, p. 210; *vividula*, Nyl., noticed, *obscura*, *clandestina*, *fulva*, and ? *braueri*, Mayr, being only races or varr. of it, *madagascariensis* n. var., pp. 211 & 212; *adlerzii*, Darnley Island, n. sp., p. 209 : Forel, Ann. Ent. Belg. xxx.

Myrmecalachista (Decamera) mayri, Chili, Forel, Ann. Ent. Belg. xxx, p. 214, n. sp.

Lasius niger, mode of swarming; Bull. Soc. Ent. Fr. (6) vi, p. clvi. *L. carnioleus*, Mayr, ♂ and worker described, pp. 206–208, *dichrous*, Rog., ♀ described, p. 208; Forel, Ann. Ent. Belg. xxx.

Myrmecocystus pallidus, Mayr, presumed var. from Morea noticed; Forel, C.R. ent. Belg. 1886, p. clxi. *M. melliger*, Llave, = (*mexicanus*, Wesm.), workers described, p. 201; *hortus-deorum*, MacCook, workers and ♂ described, pp. 202–204; *cursor*, Fonsc., var. *hellenicus*, n. n. = (*pallidus*, For., nec Mayr.), p. 204 : Forel, Ann. Ent. Belg. xxx.

Polyergus rufescens, Latr., *lucidus*, Mayr, is a race of this; Forel, Ann. Ent. Belg. xxx, p. 200. *P. rufescens*, near Stockholm, Ent. Tidskr. 1886, p. 120.

Formica. Mayr, Verh. z.-b. Wien, xxxvi, pp. 353, &c., makes the following suggestions in reference to species described by Smith :—*F. crinita* is a *Lasius*, *taprobanæ* is a *Dolichoderus*, *stricta*, Jerd., is a *Colobopsis*; *ardens*, *impetuosa*, and probably *callida*, are one species of *Camponotus*, *lutea* is a ♀ *Camponotus*, and *gibbosa* is a *Dolichoderus*, and = (*quadridenticulatus*, Rog.), *mitis*, *ventralis*, *bacchus*, are one species of *Camponotus*, to be called *C. mitis*; the following also are *Camponotobia*, *fervens*, *tenuipes*, *luctuosa*, *quadrisecta*, *natalensis*, *cosmica*, *consecrator*, *aurocincta*, *nana*, *agra*, *conspicua*, *morosa*, *levigata* : *F. arrogans*, *luciteipennis*, *fabricator* are forms of *C. sylvaticus*, Ol. : *mistura* and *exasperatus* are one species, to be called *C. mistura*, *ruficeps* is a *Colobopsis*, also *vigilans* and *vividula*; *F. suffusa*, Sm., and *C. piliventris*, Sm., are one species, to be called *C. suffusus* : *obscura*, Sm., is a *Dolichoderus*, as is also *lutosa* and = (*cingulatus*, Mayr); *decora* and *blanda* noticed; *Gigantiops destructor* = (*F. solitaria*; Sm.); *C. ruficeps*, Fabr., = (*F. bimaculata*, Sm.); *advena*, Sm., is a *Prenolepis*.

F. pratensis, note on its guests, &c.; Forel, Ann. Ent. Belg. xxx, pp. 134, 135 & 138–140. *F. rufa*, some structural points noticed; Bos, Tijdschr. Ent. xxix, pp. cii–civ. *F. nasuta*, Nyl., workers described; Forel, Ann. Ent. Belg. xxx, p. 205. *F. distinguenda*, Spin., referred to *Camponotus*, and = ? (*morosa*, Sm.), p. 364. *F. discolor* and *sansabeana*, Buckley, are a form of *Camponotus marginatus*, Latr., p. 365; *F. integra*, Nyl., n. var. *similis*, p. 425; *F. ciliata*, p. 428, n. sp., N. America : Mayr, Verh. z.-b. Wien, xxxvi. *F. exsectoides*, n. sp., p. xxxviii; *F. rufa* race *obscuripes*, n. st., p. xxxix : Forel, C.R. ent. Belg. 1886.

F. oculatissima, Attica, Forel, C.R. ent. Belg. 1886, p. clxii, n. sp.
Tapinoma glabrata, Sm., is an *Iridomyrmex*, p. 356; *T. flavipes*, Sm., is a *Prenolepis*, p. 363: Mayr, Verh. z.-b. Wien, xxxvi.
Mayria madagascariensis, Madagascar, Forel, C.R. ent. Belg. 1886, p. civ, n. sp.

Ponerides.

Ponera. Smith's *P. scalprata*, *sculpturata*, *geometrica*, *intricata*, belong to *Diacamma*; *P. nitida* is a *Lobopelta*, *maxillosa* a *Leptogenys*, *inversa* is a *Pachycondyla*, as also *carbonaria* and *pallipes*, and *P. crudelis* a *Lobopelta*; *P. lævigata* and *mordax* noticed, their genus queried; *P. tortulosa*, *sulcata*, and *concinna* belong to *Gnamptogenys*, *vagans*, *striata*, *cuprea*, and *tortuolosa*, to *Diacamma*: Mayr, Verh. z.-b. Wien, xxxvi, pp. 358, 361, & 363.

P. josephi, Bahia, Forel, C.R. ent. Belg. 1886, p. xl; *P. leeuwenhæki*, Assam, Forel, J. A. S. B. lv, p. 244: n. spp.

Pachycondyla. *P. simillima*, Sm., is a *Paltothyreus*, *rufipes*, *tridentata*, and *piliventris* belong to *Bothroponera*, *punctata* is a *Platythyrea*: Mayr, Verh. z.-b. Wien, xxxvi, p. 359. *P. hottentota*, C. Good Hope, Emery, Bull. Soc. Ent. Ital. xviii, p. 360, n. sp.

Bothroponera rufipes and *Pachycondyla bispinosa*, Sm., ♀ dimorphic forms of one species; Forel, J. A. S. B. lv, p. 246.

Parasyscia peringueyi, C. Good Hope, Emery, Bull. Soc. Ent. Ital. xviii, p. 360, n. sp.

Sysphingta europæa, Morea, Forel, C.R. ent. Belg. 1886, p. clxiii, woodcut, n. sp.

Odontomachus bispinosus, Sm., referred to *Stenomyrmex*, p. 361; Mayr, Verh. z.-b. Wien, xxxvi.

Lobopelta wood-masoni, Assam, Forel, J. A. S. B. lv, p. 246; *L. septentrionalis*, N. America, Mayr., Verh. z.-b. Wien, xxxvi, p. 438: n. spp.

Platythyrea cineracea, Guatemala, Forel, C.R. ent. Belg. 1886, p. xxxix, n. sp.

Myrmicides.

Sima clypeata, C. Good Hope, Emery, Bull. Soc. Ent. Ital. xviii, p. 361, n. sp.

Leptothorax fortinodis, N. America, Mayr, Verh. z.-b. Wien, xxxvi, p. 452; *L. echinatinodis*, Rio de Janeiro, Forel, C.R. ent. Belg. 1886, p. xlviii: n. spp.

Tetramorium. *T. nitidum*, Smith, is a *Monomorium*, *striatum*, Sm., noticed as near *Aphaenogaster*, Mayr, Verh. z.-b. Wien, xxxvi, pp. 363 & 364; *T. sigmoideum*, note on, Forel, C.R. ent. Belg. 1886, p. xlix. *T. solidum*, *quadrispinosum*, C. Good Hope, Emery, Bull. Soc. Ent. Ital. xviii, p. 362: n. spp.

Temnothorax rogeri, Emery, note on; Forel, C.R. ent. Belg. 1886, p. clxvi.

Ochetomyrmex: to this should be referred *Tetramorium auropunctatum*, Rog.; a variety of this from Guatemala named *rugosus*, Forel, C.R. ent. Belg. 1886, p. xlix.

Pogonomyrmex barbatus, Sm., nests noticed, Forel, C.R. ent. Belg. 1886, p. xlii; *P. (Myrmica) occidentalis*, Cress., = (*Myrmica seminiger*, Cress., and *P. opaciceps*, Mayr.), *id. t. c.* p. xlii; *P. nagelii*, Rio de Janeiro, *id. t. c.* p. xli, sp. n.

Iridomyrmex maccooki, Texas, Forel, C.R. ent. Belg. 1886, p. xxxix, n. sp.

Ocymyrmex, n. g. for *O. barbiger*, C. Good Hope, Emery, Bull. Soc. Ent. Ital. xviii, p. 364, sp. n.

Myrmica: Smith's *M. vastator* is a *Monomorium*, *bidentata* a *Monomorium* or *Solenopsis*; *Tapinoma melanocephalum*, F., = (*M. pellucida*, Sm.), *Mon. pharconis* = (*Myr. fragilis* and *contigua*, Sm.), *Myr. basalis* is a *Monomorium*, *trachylissa* is a *Pristomyrmex*, *longiceps* an *Aphenogaster*, as apparently also is *castanea*, *transversa* and *brevipennis* belong to *Pogonomyrmex*, *blanda* noticed and referred with doubt to *Tetramorium*, and *tristis* is a worker of *Pheidole*; *poneroides* is apparently a *Vollenhovia*, *M. punctata* and *quadrispinosa* noticed; *M. gayi*, Spin., referred to *Solenopsis*: Mayr, pp. 359, 360, 361, & 363-365. *M. ruginodo-lævinodis* changing abode; Forel, Ann. Ent. Belg. xxx, p. 137.

Oligomyrmex certzeni, Morea, Forel, C.R. ent. Belg. 1886, p. clxv, n. sp.

Aphanogaster tennesseensis, Mayr, = (*Myrmica subrubra*, Buckley) and *A. fulva*, Rog., = (*aquia*, Buck.), Mayr, Verh. z.-b. Wien, xxxvi, p. 365; *A. barbara*, n. var. *punctata*, Kashmir, Forel, J. A. S. B. lv, p. 248; *A. tennesseensis*, Mayr, ♀ = (*lævis*, Mayr), Forel, C.R. ent. Belg. 1886, p. xli. *A. (Ischnomyrmex) swammerdami*, Madagascar, *id. t. c.* p. cvi; *A. treatæ*, N. America, p. xl, *marie*, Florida, *patruelis*, Island Guadeloupe (Mexico), p. xli, *id. t. c.*; *A. lamellidens*, p. 444, *albisetosa*, p. 446, *brevicornis*, p. 447, *andrei*, *pergandei*, p. 448, N. America, Mayr, Verh. z.-b. Wien, xxxvi: n. spp.

Atta: Smith's *nodifer*, *fabricator*, *rubra*, *testacea*, *diligens*, *nigriventris*, *piliventris*, belong to *Pheidole*, *bellicosa* to *Pheidologeton*; *antipodum* noticed; *antarctica* is a *Monomorium*, *fumipennis* (the worker, at any rate) is an *Aphanogaster*; Mayr., Verh. z.-b. Wien. xxxvi, p. 360.

Ecodoma spp., habits, Brent (79).

Pheidole: *janus*, Sm., is same as *pusilla*, Heer., *comata*, *fervens*, and *cephalica*, Sm., noticed, *pabulator*, Sm., is a *Pheidologeton*, Mayr., Verh. z.-b. Wien. xxxvi, p. 360 & 361; *P. fallax*, Mayr., race *columbica*, n. st., Colombia, p. xlv, *bicarinata*, Mayr., race *vinelandica*, N. America, n. st., p. xlv, Forel, C.R. ent. Belg. 1886. *P. commutata*, Florida, Mayr., Verh. z.-b. Wien. xxxvi, p. 459; *P. guilielmi-mülleri*, Brazil, Forel, MT. schw. ent. Ges. vii, p. 210 (description amended, C.R. ent. Belg. 1886, p. xlvii); *P. gerthudæ*, Rio de Janeiro, *gouldi*, Guatemala, p. xlii, *susanne*, Guatemala, p. xliii, with race *obscurior*, n. st., Rio de Janeiro, p. xlv, *triconstricta*, Buenos Ayres, p. xlv, *morrisii*, N. America, *stulta*, Bahia, p. xlv, *absurda*, p. xlvii, *maja*, p. xlviii, Guatemala, Forel, *t. c.*: n. spp.

Monomorium subopacum, Sm., *M. australe*, n. st., Cape Good Hope; Emery, Bull. Soc. Ent. Ital. xviii, p. 363.

Solenopsis geminata, F. = (*Atta coloradensis*, Buck.), Mayr., Verh. z.-b. Wien. xxxvi, p. 365. *S. debilis*, N. America, *id. t. c.* p. 461, n. sp.

Pseudodichthadia, n. g., p. 838, for *P. incerta*, Mexico, n. sp., p. 840 (this may probably be *Eciton legionis* ♀); André, Spec. Hym. ii.

Eciton: the species tabulated, Mayr., Wien. ent. Z. v, pp. 115-122; *Eciton* and *Labidus* discussed, W. Muller (477); *Labidus*, probably the male sex of *Eciton*, *id. t. c.* p. 33; *L. burchelli*, almost certainly ♂ of *Eciton lugubre*, Rog.

Eciton (Labidus) subsulcatum, Texas, Mexico, Mayr., Verh. z.-b. Wien. xxxvi, p. 440; *E. hetschkoi*, Parana, Mayr., Wien. ent. Z. v, p. 33; *E. foreli*, *id. t. c.* pp. 116 & 121: n. spp.

Cremastogaster ashmeadi, N. America, Mayr., Verh. z.-b. Wien. xxxvi, p. 463; *C. degeeri*, Madagascar, Forel, C.R. ent. Belg. 1886, p. cvii; *C. flava*, Assam, Forel, J. A. S. B. lv, p. 248: n. spp.

Cataulacus ebrardi, Madagascar, Forel, C.R. ent. Belg. 1886, p. cv, n. sp.

Meranoplus gracilis, *striatus* and *subpilosus*, *intendens*, *attenuatus*, *puncticeps*, Sm., referred to *Cataulacus*, Mayr.; Mayr., Verh. z.-b. xxxvi, p. 361-364.

M. peringueyi, Cape Good Hope, Emery, Bull. Soc. Ent. Ital. xviii, p. 365, n. sp.

Strumigenys friderici-mülleri, p. 213, *smithii*, p. 215, Brazil, Forel, MT. schw. ent. Ges. vii, n. spp.

Leptogenys insularis, Smith, ♂ described; Cam., P. Manch. Soc. xxv, p. 175.

Formicoxenus nitidulus, Nyl., habits, &c., of; Adlerz, *Myrmecologiska studier*, Öfv. Ak. Förh. 1884, pp. 43-64, pls. xxvii & xxviii: note on; Forel, Ann. Ent. Belg. xxx, pp. 131-135: characters of ♂; Ent. M. M. xxiii, p. 42.

Stenamma nearcticum, N. America, Mayr, Verh. z.-b. Wien, xxxvi, p. 454, n. sp.

Melophorus, Lub., amended characters; *M. bagoti* worker described; Forel, Ann. Ent. Belg. xxx, p. 213.

Dorylides.

Alaopone abeillei, Oran, André, Spec. Hym. ii, p. 855, n. sp.

TEREBRANTIA.

[Cf. Ashmead (8, 9, 10, 11), Bridgman (81), Buysson (102), Cameron (55, 107, 110, 247), Costa (131, 132), Holmgren (300, 301), Howard (309, 310), Kirby (352), Kriechbaumer (380), Mayr (430), Mocsáry (456), Möller (460), Müller (472, 473, 474), Poulton (560), Provancher (562), Radoszkowski (574), Rudow (621, 622, 623), Schletterer (634), Stefani (683), Thomson (698, 699).]

CHRYSIDIDÆ.

Cleptes putoni, Basses-Alpes, Buys., Rev. d'Ent. v, p. 151, n. sp.

ICHNEUMONIDÆ.

List of some species and their Lepidopterous hosts; P. E. S. Lond. Soc. 1886, pp. 42 & 43.

Parasites of *Charaxes graminis*; Nerén, Ent. Tidskr. 1886, pp. 43, 50, & 133.

Ichneumonides.

Ichneumon, subgg. of, described ; Th., Ann. Soc. Ent. Fr. (6) vi, pp. 11 & 12. Subg. *Ichneumon vere* sectionised, and many previously known European species redescribed or noticed ; *id. t. c.* pp. 12-24.

Ichneumon pisorius, L., characters and synonymy of, and allies ; Holm., Ent. Tidskr. 1886, p. 43. *I. bipustulatus*, Sm., figured ; Waterh., Aid, pl. 169, fig. 3.

I. melanothorax, Germany, Kriechb., Ent. Nachr. xii, p. 241 ; *I. jesperi*, Denmark, Holm., Ent. Tidskr. 1886, p. 43 ; *I. decreescens*, p. 13, *truncatulus*, *anospilus*, p. 15, *simulosus*, p. 16, *crassifemur*, p. 18, *brevigena*, p. 19, *macrocerus*, p. 20, *longeareolatus*, *gibbulus*, p. 21, *spiracularis*, p. 22, *grandicornis*, p. 24, Europe, Th., Ann. Soc. Ent. Fr. (6) vi ; *I. obsoletorius*, Sardinia, Costa, Rend. Acc. Nap. xxv, p. 53 ; *I. gastoldi*, Sardinia, *id. op. cit.* xxiv, p. 323 ; *I. adjunctus*, p. 29, *aterrimus*, *ontariensis*, p. 30, *citrinus*, *absconditus*, p. 31, *approximans*, p. 32, *quadripunctatus*, p. 33, Quebec, Prov., Add. Hym. Queb. ; *I. pacificus*, Juan Fernandez, Cam., P. N. H. Soc. Glasg. (n.s.) i, p. 204 : n. spp.

Trogus cyaneipennis, Sardinia, Costa, Rend. Acc. Nap. xxiv, p. 323, n. sp.

Ichneumon (Amblyteles) puerperæ, Mocs., described at length and figured ; Mocs., Math. term. köz. xx, pp. 77 & 78, pl. vii.

Amblyteles debilis, Germany, Kriechb., Ent. Nachr. xii, p. 242 ; *A. spilosomæ* (from pupa of *S. menthastris*, Esp.), p. 106, *dirus*, p. 119, *mæstus*, p. 123, Hungary, Mocs., Math. term. köz. xx ; *A. ludovicus*, Japan, Cam., P. N. H. Soc. Glasg. (n.s.) i, p. 272 ; *A. macrocephalus*, p. 34, *superbus*, p. 35, Quebec, Prov., Add. Hym. Queb. : n. spp.

Hoplismenus mikado, Japan, Cam., P. N. H. Soc. Glasg. (n.s.) i, p. 274 ; *H. stygius*, Ontario, Prov., Add. Hym. Queb. p. 34 : n. spp.

Platylabus gigas, Germany, Kriechb., Ent. Nachr. xii, p. 243 ; *P. magnificus*, p. 36, *mitralis*, *crassicornis*, *acilatus*, p. 37, *cincticornis*, *ruficornis*, p. 38, Quebec, Prov., Add. Hym. Queb. : n. spp.

Phæogenes modestus, Wesm., described, Bridgm., Tr. E. Soc. 1886, p. 336, reared from *Euchromia flammea*, p. 337.

P. nitidus, England, Bridgm., Tr. E. Soc. 1886, p. 337 ; *P. sesive*, Hungary, Mocs., Math. term. köz. xx, p. 135 ; *P. crassitelus*, p. 41, *recticornis*, *recticaudus*, p. 42, *pinguis*, *annulatipes*, *indistinctus*, p. 43, Quebec, Prov., Add. Hym. Queb. : n. spp.

Exephanes japonicus, Japan, Cam., P. N. H. Soc. Glasg. (n.s.), i, p. 273, n. sp.

Cryptides.

Stilpnus appendiculatus, Ottawa, Prov., Add. Hym. Queb. p. 44, n. sp.

Phygadeuon rusticellæ, England (in old birds'-nests), Bridgm., Tr. E. Soc. 1886, p. 337 ; *P. proximator*, Sardinia, Costa, Rend. Acc. Nap. xxiv, p. 323 ; *P. spinosus*, *bispinosus*, *pachycephalus*, *pictipes*, p. 6, *leucostictus*, p. 7, *brumate* (from pupa of *Cheimatobia brumata*), *lycæne*, *nematorum*, p. 11, *zonatus*, p. 12, Europe, Rudow, Soc. Ent. i ; *P. guignardi*, p. 50, *electus*, *fusiformis*, p. 51, *longicornis*, *nigriceps*, p. 52, *truncatus*, *jocosus*, p. 53, *brevicaudus*, *geddessi*, p. 54, *fasciatus*, *fraterculus*, p. 55, *gracilicornis*, *marginata*.

tus, p. 56, *similaris*, *capitalis*, p. 57, Quebec, Prov., Add. Hym. Queb. : n. spp.

Hemiteles thyridopterygis, parasite of, noticed; Howard, P. E. S. Wash. i, p. 28. *H. floricator*?, bred from old birds'-nests; Bridgm., Tr. E. Soc. 1886, p. 338. *H. ruficaudatus*, Bridgm., referred to *Stylocryptus*, Bridgm., t. c. p. 339. *H. mixtus*, Bridgm., referred to *Phygadeuon*; id. l. c. *H. argentatus*, Gr., = ? (*gyrini*, Parft.) ; Bridgm., t. c. p. 339.

H. minutus, England, Bridgm., Tr. E. Soc. 1886, p. 340; *H. microgastri*, *nebulosus*, Europe, *maculipennis*, and *sericeus* (sic), Thuringia, p. 17, *ruficollis*, *pectoralis*, p. 27, Europe, Rudow, Soc. Ent. i; *H. mucronatus*, p. 58, *debilis*, *gigas*, p. 59, *declivus*, *aciculatus*, p. 60, Quebec, Prov., Add. Hym. Queb.; *H. rufithorax*, Panama, *flavovariegatus*, Guatemala, pl. x, fig. 23, p. 254, *sexlineatus*, p. 255, *macula*, p. 256, Mexico, *albituberculatus*, Panama, pl. x, fig. 25, *montezuma*, Mexico, pl. x, fig. 26, p. 257, *ornaticeps*, Panama, pl. x, fig. 24, p. 258, *leucosoma*, *ruficornis*, Guatemala, *mexicanus*, Mexico, p. 259, Cam., Biol. Centr. Am. Hym. : n. spp.

Pezomachus costatus, p. 341, *vagantiformis*, p. 342, *foersteri*, p. 343, England, Bridgm., Tr. E. Soc. 1886; *P. sulcatus*, Ottawa, Prov., Add. Hym. Queb. p. 77 : n. spp.

Hemimachus ephippium, Europe, Rudow, Soc. Ent. i, p. 27, n. sp.

Aptesis tricolor, Zerbst, p. 28, *spectabilis*, North France, p. 29, Rudow, Soc. Ent. i, n. spp.

Cryptus, notes on and characters of various species; Holm., Ent. Tidskr. 1886, pp. 17-29.

C. filicornis, Switzerland, *coxalis*, Harz, p. 107, *tuberculipes*, Alps, p. 115, Rudow, Soc. Ent. i; *C. oriticus*, *rudowi*, Sicily, Stef., Nat. Sicil. v, p. 184; *C. pentagonalis*, p. 66, *brevicornis*, *sordidus*, p. 67, *spissicornis*, *mellipes*, *longicaudus*, p. 68, *scutellatus*, *erythropygus*, p. 69, *amblytelarius*, *incognitus*, p. 70, *collaris*, *dubius*, p. 71, *pubescens*, *linearis*, p. 72, *perditus*, *ignotus*, *segregatus*, p. 73, *triannulatus*, *gracilis*, p. 74, *rectus*, *albonotatus*, *mellicoxus*, p. 75, Quebec, Prov., Add. Hym. Queb. : n. spp.

Polycyrtus erythrosternus, pl. ix, fig. 20, *tinclipennis*, pl. ix, fig. 19, p. 241, *chiriquensis*, p. 242, *curviventris*, pl. x, fig. 28, p. 243, Panama, *curvispina*, Costa Rica, p. 244, Cam., Biol. Centr. Am. Hym., n. spp.

Polyenus championi, Panama, pl. ix, fig. 23, *nitidiusculus*, Guatemala, p. 245, *orizabensis*, Mexico, *basimacula*, Guatemala, pl. ix, figs. 24 & 25, p. 246, *volcanicus*, Panama, p. 247, Cam., Biol. Centr. Am. Hym., n. spp.

Christolia panamensis, Panama, pl. x, fig. 27, p. 247, *menticula*, Mexico to Panama, pl. x, fig. 29, p. 248, *graciliventris*, Mexico, p. 249, *tarsoleucus*, *pulchripes*, Guatemala, p. 250, Cam., Biol. Centr. Am. Hym., n. spp.

Cryptanura incauta, pl. x, fig. 30, p. 251, *laticarinata*, Panama, *pedicata*, Mexico, p. 252, Cam., Biol. Centr. Am. Hym., n. spp.

Ophionides.

Thyreodon niger, Cres., figured, pl. xii, fig. 12; *T. laticinctus*, Cres. = (*principalis*, Sm.), p. 289, pl. xii, fig. 14; Biol. Centr. Am. Hym.

T. erythroceræ, Mexico, pl. xii, fig. 13, p. 288, *rufithorax*, pl. xii, fig. 15, Panama, p. 290, Cam., Biol. Centr. Am. Hym., n. spp.

Ophion mexicanus, Cres., pl. xii, fig. 23, *concolor*, Cres., fig. 24, *flavo-*

scutellatus, Br. (sub nom. *thoracicus*), fig. 25, *flavus*, F., fig. 21, figured ; Cam., Biol. Centr. Am. Hym.

O. dichromopterus, Sardinia, Costa, Rend., Acc. Nap. xxiv, p. 324 ; *O. (Enicospilus) fuscicornis*, Guatemala, p. 291, *monticola*, Guatemala, pl. xii, fig. 28, *maculipennis*, Panama, pl. xii, fig. 29, p. 292, *guatemalensis*, Guatemala, pl. xii, fig. 22 ; *O. curvinervis*, Guatemala, pl. xii, fig. 19, p. 293, *chiriquensis*, pl. xii, fig. 20, Panama, *flavo-orbitalis*, Mexico, Panama, pl. xii, fig. 16, *ancyloneura*, Guatemala, pl. xii, fig. 17, p. 294, *melanostigma*, Panama, pl. xii, fig. 18, p. 295, Cam., Biol. Centr. Am. Hym. : n. spp.

Ophiopterus fuscipes, *niger*, p. 296, *striatifrons*, p. 297, Mexico, Cam., Biol. Centr. Am. Hym., n. spp.

Campoplex punctatus, p. 345, *costulatus*, p. 346, *femorator*, p. 347, England, Bridgm., Tr. E. Soc. 1886 ; *C. scalaris*, Quebec, Prov., Add. Hym. Queb. p. 84 ; *C. guatemalensis*, Guatemala, p. 304, *verapacis*, pl. xiii, fig. 3, Mexico, Guatemala, *mexicanus*, pl. xiii, fig. 4, p. 305, Mexico, Cam., Biol. Centr. Am. Hym. : n. spp.

C. tepanecus, Cres., pl. xiii, fig. 1, *divisus*, Cres., fig. 2, figured ; Cam., Biol. Centr. Am. Hym.

Thymaris fasciatus, England, Bridgm., Tr. E. Soc. 1886, p. 348, n. sp.

Eoxochilum (Anomalon) capitatum, Desv., noticed ; Bridgm., Tr. E. Soc. 1886, p. 344.

Anomalon secernendum, *posticum*, Sardinia, Costa, Rend. Acc. Nap. xxiv, p. 324 ; *A. rufulum*, p. 80, *unicolor*, *chlamidatum*, p. 82, *filiforme*, p. 83, Quebec, Prov., Add. Hym. Queb. ; *A. guatemalenum*, pl. xii, fig. 26, p. 300, *quadrilineatum*, p. 301, Guatemala, Cam., Biol. Centr. Am. : n. spp.

Heteropelma longipes, California, Prov., Add. Hym. Queb. p. 121 ; *H. sonorensis*, Mexico, pl. xii, fig. 30, p. 298, Cam., Biol. Centr. Am. Hym. : n. spp.

Eiphosoma mexicanum, figured, pl. xii, fig. 31 ; Biol. Centr. Am. Hym.

Retanisia, n. g. for *R. facialis*, Guat., n. sp., pl. xii, fig. 10 ; Cam., Biol. Centr. Am. Hym. p. 299.

Nonnus atratus, Cres. (sub nom. *Nonus niger*), pl. xii, fig. 8, *antennatus*, Cres., fig. 9, figured ; Cam., Biol. Centr. Am. Hym.

Grotea fulva, Mexico, Cam., Biol. Centr. Am. Hym. p. 309, pl. xii, fig. 27, n. sp.

Scolobates (?) varicornis, Guatemala, Cam., Biol. Centr. Am. Hym. p. 310, pl. xii, fig. 5, n. sp.

Limneria ramidula, bred from *Retinia pinivorana* ; Bridgm., Tr. E. Soc. 1886, p. 351.

L. tripunctata, p. 351, *variabilis* (bred from *Gelechia notatella*), p. 352, England, Bridgm., Tr. E. Soc. 1886 ; *L. guignardi*, p. 87, *brevicauda*, *crassicornis*, p. 88, *pilosula*, p. 89, Quebec, Prov., Add. Hym. Queb. ; *L. albispina*, pl. xi, fig. 13, *alpestris*, *sonorensis*, pl. xiii, fig. 6, p. 307, *montezuma*, p. 308, Mexico, Cam., Biol. Centr. Am. Hym. ; *L. hawaiiensis*, Oahu, Cam., P. Manch. Soc. xxv, p. 180 : n. spp.

Podogaster sulcatus, Ottawa, Prov., Add. Hym. Queb. p. 90, n. sp.

Paniscus cephalotes, notes upon its larva parasitic upon the larva of

Dicranura vinula ; Poulton, Tr. E. Soc. 1886, pp. 162-168 ; *P. geminatus*, Say, figured, pl. xiii, fig. 5, Biol. Centr. Am. Hym. *P. tinctipennis*, *melanostigma*, Panama, p. 303, *id. t. c.* ; *P. alpinus*, Switzerland, Rudow, Soc. Ent. i, p. 41 : n. spp.

Porizon arthroleucus, Sardinia, Costa, Rend. Acc. Nap. xxiv. p. 324 ; *P. elongatum*, Canada, Prov., Add. Hym. Queb. p. 91 : n. spp.

Banchus mexicanus, N. Mexico, Cam., Biol. Centr. Am. Hym. p. 311, pl. xii, fig. 6 ; *B. caudatus*, California, Prov., Add. Hym. Queb. p. 121 : n. spp.

Banchopsis, n. g. near *Banchus*, for *B. græca*, Greece, n. sp. ; Kriechb., Ent. Nachr. xii, p. 244.

Banchopsis n. g., between *Banchus* and *Hellwigia*, for *B. crassicornis*, sp. n., S. Europe ; Rudow, Soc. Ent. i, p. 34.

Pyracmon incompletum, Ottawa, Prov., Add. Hym. Queb. p. 80, n. sp.

Thersilochus marginatus, S. England, Bridgm., Tr. E. Soc. 1886, p. 354 ; *T. maturus*, *errabundus*, Quebec, Prov., Add. Hym. Queb. p. 92 : n. spp.

Exetastes albiger, Dalmatia, Kriechb., Ent. Nachr. xii, p. 245 ; *E. æthiops*, Normandy, *ruficornis*, Centr. Europe, Rudow, Soc. Ent. i, p. 42 : n. spp.

Leptobatus not distinct from *Exetastes* ; Kriechb., Ent. Nachr. xii, p. 245.

Agathophiona fulvicornis, Westw., figured, pl. xii, fig. 11 ; Cam., Biol. Centr. Am. Hym.

Tryphonides.

Mesoleptus scutellatus, *marginatus*, England, Bridgm., Tr. E. Soc. 1886, p. 356 ; *M. angustus*, *annulatipes*, p. 96, *perditus*, *rufomixtus*, p. 97, *filiformis*, *barbatus*, *largus*, p. 98, *nigricornis*, p. 99, Quebec, Prov., Add. Hym. Queb. ; *M. mexicanus*, pl. xi, fig. 22, p. 281, *alpestris*, pl. xi, fig. 24, p. 282, *persimilis*, pl. xi, fig. 25, Mexico, *guatemalensis*, Guat., p. 283, Cam., Biol. Centr. Am. Hym. : n. spp.

Mesostenus xanthothorax, Br., referred to *Polycyrtus*, figured, pl. x, fig. 12, and described, p. 243 ; Cam., Biol. Centr. Am. Hym.

M. cingulatellus, Sardinia, Costa, Rend. Acc. Nap. xxiv, p. 323 ; *M. pluricinctus*, *armatus*, p. 76, *latigaster*, p. 77, Quebec, Prov., Add. Hym. Queb. : n. spp.

Stibeutes longicauda, p. 33, *atratus*, p. 34, S. Europe, Rudow., Soc. Ent. i, n. spp.

Existon marginatum, Toronto, Prov., Add. Hym. Queb. p. 100, n. sp.

Mesoleius canina, England (bred from *Eriocampa canina*), Bridgm., Tr. E. Soc. 1886, p. 363 ; *M. tricoloripes*, Sardinia, Costa, Rend. Acc. Nap. xxiv, p. 323 ; *M. scutellaris*, Europe, Rudow, Soc. Ent. i, p. 42 ; *M. annulatus*, *telarius*, p. 106, *inflatifrons*, p. 107, Canada, Prov., Add. Hym. Queb. ; *M. costaricensis*, Costa Rica, p. 284, *zapotecus*, p. 285, *montezuma*, p. 286, pl. xii, fig. 4, Mexico, Cam., Biol. Centr. Am. Hym. : n. spp.

Prionopoda glaber, England, Bridgm., Tr. E. Soc. 1886, p. 360, n. sp.

Exenteron hullensis, Canada, Prov., Add. Hym. Queb. p. 104, n. sp.

Orthocentru spirasii, Sardinia, Costa, Rend. Acc. Nap. xxiv, p. 323, n. sp.
Polyblastus decoratus, p. 107, *annulicornis*, *inornatus*, p. 108, Canada, Prov., Add. Hym. Queb. ; *P. (?) aztecus*, N. Mexico, pl. xii, fig. 3, p. 287, Cam., Biol. Centr. Am. Hym. : n. spp.

Cteniscus crassipes, Toronto, Prov., Add. Hym. Queb. p. 109, n. sp.

Astiphrommus and *Stictopisthus*, n. subgg. of *Mesochorus* ; Th., Ann. Soc. Ent. Fr. (6) v, p. 327.

Mesochorus pictus, Brisch., position of ; Bridgm., Tr. E. Soc. 1886, p. 353. *M. dorsalis*, Holmg., = (*hirsutulus*, Bridgm.) ; Th., Ann. Soc. Ent. Fr. (6) v.

M. (Astiphrommus) graniger, p. 328, *buccatus*, p. 329, *hamulus*, *mandibularis*, p. 330, *incidens*, p. 331, *simplex*, *tenuicornis*, *plagiatus*, p. 332, (*Mesochorus*) *tuberculiger*, p. 333, *nigriceps*, *punctiplexuris*, p. 334, *curvicauda*, *brevicollis*, p. 335, *temporalis*, *pectinipes*, *fulvus*, *lapponicus*, p. 336, *longicauda*, *brevigena*, *salicis*, p. 338, *crassicus*, *marginatus*, p. 339, *tenuiscapus*, *albipes*, *stigmaticus*, p. 341, *macrurus*, p. 342, *acuminatus*, *angustatus*, *curvulus*, p. 343, *M. (Stictopisthus) bilineatus*, *laticeps*, *convexicollis*, p. 344, Europe, Th., Ann. Soc. Ent. Fr. (6) v, n. spp.

Tryphon vulgaris, Fab., monstrosity of antennæ figured ; Rov. Lapok. iii, p. 44.

T. fractus, p. 101, *pediculatus*, p. 102, *tuberculifer*, p. 103, *rufigaster*, *hullensis*, p. 104, Quebec, Prov., Add. Hym. Queb. ; *T. montezuma*, Mexico, pl. xii, fig. 2, p. 286, Cam., Biol. Centr. Am. Hym. : n. spp.

Erronemus tristis, Ottawa, Prov., Add. Hym. Queb. p. 110, n. sp.

Exochus rufomaculatus, Ottawa, Prov., Add. Hym. Queb. p. 113 ; *E. stramineipes*, Panama, pl. xi, fig. 7, *puncticeps*, p. 279, *melanocephalus*, p. 280, Mexico, Cam., Biol. Centr. Am. Hym. : n. spp.

Bassus frontalis, Cress., figured, pl. xi, fig. 8 ; Biol. Centr. Am. Hym.

B. scutellaris, p. 364, *abdominator*, p. 365, S. England, Bridgm., Tr. E. Soc. 1886 ; *B. cylindricus*, p. 111, *dorsalis*, p. 112, Canada, Prov., Add. Hym. Queb. : n. spp.

Euryproctus sinister bred from *Eriocampa varipes* ; Bridgm., Tr. E. Soc. 1886, p. 357.

E. minutus, England, Bridgm., Tr. E. Soc. 1886, p. 358, n. sp.

Grypocentrus bipunctatus, England, Bridgm., Tr. E. Soc. 1886, p. 358, n. sp.

Cœlocentrus mellipes, Canada, Prov., Add. Hym. Queb. p. 113, n. sp.

Phrudus, n. g. (*Ctenopelnidae*), for *P. monilicornis*, England, n. sp. ; Bridgm., Tr. E. Soc. 1886, p. 361.

Perilissus triangulatus, England, Bridgm., Tr. E. Soc. 1886, p. 362, n. sp.

Pimplides.

Rhyssa nigritarsis, Panama, pl. xi, fig. 3, p. 260, *carinifrons*, Nicaragua and Panama, p. 261, Cam., Biol. Centr. Am. Hym., n. spp.

Epirhyssa mexicana, Cres., figured, pl. xi, fig. 2 ; Cam., Biol. Centr. Am. Hym.

E. japonica, Japan, Cam., P. N. H. Soc. Glasg. (n.s.) i, p. 275 ; *E. clavata*, Canada, Prov., Add. Hym. Queb. p. 115 : n. spp.

Ephialtes variatipes, Ottawa, Prov., Add. Hym. Queb. p. 114 ; *E. annu-*

licornis, Guatemala to Panama, p. 262, pl. xi, fig. 1, *nigricans*, Guatemala, pl. xi, fig. 5, p. 263, Cam., Biol. Centr. Am. Hym. : n. spp.

Echthromorpha flavo-orbitalis, Hawaiian Is., Cam., P. Manch. Soc. xxv, p. 178; *E. walkeri*, Tahiti, Cam., P. N. H. Soc. Glasg. (n.s.), i, p. 265 : n. spp.

Theronia chiriquensis, Panama, pl. xi, fig. 6, p. 264, Cam., Biol. Centr. Am. Hym., n. sp.

Pimpla lineata, Sm., referred to *Theronia*, described and figured ; Cam., Biol. Centr. Am. Hym. p. 264, pl. xi, fig. 4. *P. croceipes*, Cres., = (*modesta*, Sm.), pl. xi, fig. 12, *coxata*, Sm., pl. xi, fig. 14, figured ; *id. t. c.*

P. hirticauda, Ottawa, Prov., Add. Hym. Queb. p. 116 ; *P. hawaiiensis*, Oahu, Cam., P. Manch. Soc. xxv, p. 178 ; *P. sedula*, Panama, pl. xi, fig. 10, p. 265, *montezuma*, *mexicana*, p. 266, *albomarginata*, pl. xi, fig. 15, p. 267, Mexico, *xanthostigma*, Panama, pl. xi, fig. 9, *argentifrons*, Guatemala, pl. xi, fig. 17, p. 269, Cam., Biol. Centr. Am. Hym. : n. spp.

Epimecis tibialis, Mexico to Panama, pl. xii, fig. 1, p. 270, *mexicana*, Mexico, p. 271, Cam., Biol. Centr. Am. Hym., n. spp.

Schizopyga circulator, Panz., = (*tricingulata*, Gr., vars. 2, 3, and *analis*, Gr.) ; Bridgm., Tr. E. Soc. 1886, p. 373.

Glypta ceratites var. ? bred from *Euchromia flammeana* ; Bridgm., Tr. E. Soc. 1886, p. 366.

G. parvicornuta, *similis*, p. 367, *trochanterata*, p. 368, England, Bridgm., Tr. E. Soc. 1886 ; *G. sardoa*, Sardinia, Costa, Rend. Acc. Nap. xxv, p. 53 ; *G. californica*, California, Prov., Add. Hym. Queb. p. 117 ; *G. rufomarginata*, Mexico, pl. xi, fig. 18, p. 271, Cam., Biol. Centr. Am. Hym. : n. spp.

Odontopimpla, n. g. for *P. (?) pulcherrima*, Cres. ; the insect figured, pl. xi, fig. 11, = (*P. lavigata*, Sm.) ; Cam., Biol. Centr. Am. Hym. p. 272.

Lampronota nigripes, Ottawa, Prov., Add. Hym. Queb. p. 118, n. sp.

Xylonomus calidus, Ottawa, Prov., Add. Hym. Queb. p. 119, n. sp.

Lissonota leptogaster and *caligata*, Holm., ? sexes of one species ; Bridgm., Tr. E. Soc. 1886, p. 369. *L. brachycentra*, Gr., described at length ; *id. l. c.* *L. lineata*, Gr., (and dubious allied species) discussed ; bred from *Crambus contaminellus* : Bridgm., *t. c.* p. 372. *L. extensor*, L., parasitic on *Hadena secalis*, described and referred to *Meniscorus* ; Holm., Ent. Tidskr. 1886, p. 71.

L. rufomedia (bred from *Crambus contaminatellus* and *Eudora murana* and *mercurella*), p. 370, *nitida* (from *Botys asinalis*), p. 371, *subaciculata*, p. 372, Britain, Bridgm., Tr. E. Soc. 1886 ; *L. albispina*, Panama, pl. xi, fig. 19, *leucozona*, p. 273, *erythropoda*, Guatemala, *pulchra*, Mexico, p. 274, *leucopoda*, Panama, pl. xi, fig. 20, p. 275, Cam., Biol. Centr. Am. Hym. : n. spp.

Phytodietus cressoni, Panama, *guatemalensis*, Guatemala to Panama, pl. xi, fig. 21, p. 276, Cam., Biol. Centr. Am. Hym., n. spp.

Sagaritis punctata parasitic on *Plusia orichalcea*, p. 349, *postica*, p. 350, England, Bridgm., Tr. E. Soc. 1886, n. spp.

Aplomerus, n. n. for *Platysoma*, Prov. ; Prov., Add. Hym. Queb. p. 119.

Agathilla, Westw., to be placed in *Pimplides* ; Cam., Biol. Centr. Am. Hym. p. 277.

BRACONIDÆ.

Bracon nigripes, Canada, Prov., Add. Hym. Queb. p. 121; *B. compunc-*
tor, pl. xiii, fig. 11, and p. 313, *frustratus*, pl. xiii, fig. 8, and p. 314,
albipalpis, pl. xiii, fig. 7, Panama, *gracilescens*, Nicaragua, pl. xiii, fig. 9,
 p. 315, *bugabensis*, pl. xiii, fig. 10, p. 316, *distinguendus*, pl. xiii, fig. 12,
 p. 317, *apicipennis*, pl. xiii, fig. 13, Panama, *heterodoxus*, Guatemala, p. 318,
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 p. 323, *forreri*, p. 324, *alticola*, *hebes*, p. 325, *blandicus*, pl. xiii, fig. 17,
 p. 326, *democraticus*, pl. xiii, fig. 19, *comparatus*, *crudelis*, p. 327, *monti-*
vagus, pl. xiii, fig. 16, p. 328, Mexico, Cam., Biol. Centr. Am. Hym. :
 n. spp.

Chelonus rufiscapus, p. 144, *argentifrons*, p. 145, Canada, Prov., Add.
 Hym. Queb., n. spp.

Sigalphus trisectus, Canada, Prov., Add. Hym. Queb. p. 143, n. sp.

Syngaster atripes, *rugosus*, Canada, Prov., Add. Hym. Queb. p. 122,
 n. spp.

Rhitigaster ovalis, Quebec, Prov., Add. Hym. Queb. p. 146, n. sp.

Ascogaster rufipes, Quebec, Prov., Add. Hym. Queb. p. 146, n. sp.

Brachistes crassigaster, Quebec, Prov., Add. Hym. Queb. p. 132, n. sp.

Helcon cornutus, Japan, Cam., P. N. H. Soc. Glasg. (n. s.) i, p. 270, n. sp.

Orgilus detectus, Ottawa, Prov., Add. Hym. Queb. p. 134, n. sp.

Capitonius rubriceps, Ottawa, Prov., Add. Hym. Queb. p. 135, n. sp.

Agathis scrutator, Quebec, Prov., Add. Hym. Queb. p. 137, n. sp.

Microdus dispar, *nigricoxus*, Quebec, Prov., Add. Hym. Queb. p. 138,
 n. spp.

Phylax curtus, p. 133, *gracilis*, p. 131, Quebec, Prov., Add. Hym. Queb.

n. spp.

Blacus longicaudus, *defectuosus*, Ottawa, Prov., Add. Hym. Queb. p. 133,

n. spp.

Microgaster brevicaudus, 4-dentatus, p. 140, *lateralis*, *auripes*, p. 141,
crassicornis, *femurnigrum*, *acaudus*, p. 142, *longicornis*, *melligaster*, p. 143,
 Canada, Prov., Add. Hym. Queb. n. spp.

Apanteles jucundus, Marsh., reared from larvæ of *Pieris brassicæ*, and
 figured; P. S. Lond. E. S. 1886, p. 63, pl. i, fig. 12.

Microctonus cephalicus, *linearis*, Canada, Prov., Add. Hym. Queb.
 p. 127, n. spp.

Gamosecus laticeps, Ottawa, Prov., Add. Hym. Queb. p. 126, n. sp.

Rhopalophorus petiolatus, p. 128, *longicornis*, *fasciatus*, p. 129, Canada,
 Prov., Add. Hym. Queb. n. spp.

Opius macrocephalus, p. 123, *ruficeps*, *cinctus*, p. 124, Canada, Prov.,
 Add. Hym. Queb. n. spp.

Perilitus gracilis, *robustus*, p. 125, *politus*, *incompletus*, p. 126, Canada,
 Prov., Add. Hym. Queb. n. spp.

Calyptus, larva of preying on *Lyctus canaliculatus*, Luc., Bull. Soc. Ent.
 Fr. (6) vi, p. clxxiv.

Meteorus luridus, Ruthe, reared from *Noctua brunnea*, P. S. Lond. E. S. 1886, p. 42.

Phanodiscus planicornis, Sicily, Stef., Nat. Sicil. v, p. 181, n. sp.

Alysia manducator, Panz., bred from *Creophilus maxillosus*; P. S. Lond. E. S. 1886, p. 25.

Alysia completa, Quebec, Prov., Add. Hym. Queb. p. 147, n. sp.

Dacnusa crassitela, p. 148, *spatulata*, p. 149, Ottawa, Prov., Add. Hym. Queb., n. spp.

Asynaphes, n. g., p. 150, for *Alysia caudata*, Prov., and to include *A. aciculata*, p. 150, *brevicauda*, p. 151, n. spp., Quebec; Prov., Add. Hym. Queb.

Ephedrus incompletus, *completus*, Canada, Prov., Add. Hym. Queb. p. 156, n. spp.

Aphidius obscurus, Quebec, Prov., Add. Hym. Queb. p. 152, n. sp.

Aphidaria, n. g., p. 152, for *A. simulans*, n. sp., p. 153, Ottawa; Prov., Add. Hym. Queb.

Neuropenes, n. g., for *N. ovalis*, Ottawa, n. sp.; Prov., Add. Hym. Queb. p. 153.

Trinaria, n. g., for *T. pilicornis*, n. sp., Quebec; Prov., Add. Hym. Queb. p. 149.

Ropronia, n. g., for *R. pediculata*, Ottawa, n. sp.; Prov., Add. Hym. Queb. p. 154.

Radiolaria, n. g., p. 154, for *R. clavata*, Ottawa, n. sp., p. 155; Prov., Add. Hym. Queb.

Scotioneurus, n. g., p. 156, for *S. dives*, *stenostigma*, n. spp., Ottawa, p. 157; Prov., Add. Hym. Queb.

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CHALCIDIDÆ.

Generic synopsis of the Hymenopterous family *Chalcididae*; Howard, Ent. Am. i, pp. 197-199 & 215-219.

Leucospis gigas: habits, metamorphoses, pp. 155, &c.; secondary larva figured, p. 156; primary, p. 213; egg, p. 176: Fabre, Souvenirs, iii. *L. coxalis*, Kirby, figured; Waterh., Aid, pl. 169, fig. 1.

L. turkestanica, Central Asia, Rad., Hor. Ent. Ross. xx, p. 51, n. sp.

Chalcis pallipes, n. n. for *C. flavipes*; Ashm., Ent. Am. ii, p. 19.

Chalcis kassalensis, Kassala, Kirby, J. L. S. xx, p. 36, pl. i, fig. 9, n. sp.

Monodontomerus cupreus, habits and metamorphoses; Fabre, Souvenirs, iii, pp. 179, &c. *M. nitidus*, Newp., notes on habits and larva; Lampert, JH. Ver. Württ. xlii, pp. 95-97. *M. æreus*, Walk., its victims; Wachtl., Wien. ent. Z. v, p. 306.

Diomorus armatus, Boh., and *calcaratus*, Nees, bred from galls of *Cynips kollari*, Wien. ent. Z. v, p. 307.

Megastigmus flavipes, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 128, n. sp.

Torymus nobilis, Boh., lives in galls of *Cynips subterranea*, Gir.; *T. ventralis*, Fonsc., in galls of *Homomyia fischeri*, Frf.; and *T. fuscipes*, Boh., is parasitic on *Cecidomyia saliciperda*, Duf.: Wien. ent. Z. v, p. 307.

Oligosthenus stigma, F., lives in galls of *Rhodites spinosissimæ*, Gir.; Wien. ent. Z. v, p. 307.

Syntomaspis lazulina, Först., reared from galls of *Dryophanta cornifex*, Htg.; Wien. ent. Z. v, p. 307.

S. californica, California, Ashm., Tr. Am. Ent. Soc. xiii, p. 127, n. sp.

Lochites papaveris, Först., parasitic on *Aulax jaceæ* in galls of *Centaurea paniculata*; Wien. ent. Z. v, p. 307.

Podagrion mantis, Florida, Ashm., Canad. Ent. xviii, p. 57, n. sp.

**Sur l'Eurytoma longipennis*, Walk.; Giard, Ann. Sci. Nord., Ann. 7/8, No. 7/8, pp. 285-287.

Decatoma floridana, n. n. for *flavicollis*; Ashm., Ent. Am. ii, p. 19.

D. maculipes, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 126, n. sp.

Isosoma tritici, grande, habits (? one species), Webster, Riley, Rep. 1885, pp. 311-315.

I. gigantea, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 127, n. sp.

Systole brachyptera, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 126, n. sp.

Perilampus maurus reared from *Antheræa tirrhea*; P. E. Soc. 1886, p. lii.

P. fulvicornis, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 126, n. sp.

Tricoryna, n. g., type *Eucharis iello*, Walk.; Kirby, J. L. S. xx, p. 29.

Metagea, n. g., type *Eucharis zalates*, Walk.; Kirby, J. L. S. xx, p. 30.

Chalcura, n. g., type *Eucharis deprivata*, Walk.; Kirby, J. L. S. xx, p. 30.

Rhipipallus, n. g., type *Eucharis volusa*, Walk.; Kirby, J. L. S. xx, p. 31; *R. cameroni*, Australia or Celebes, *id. t. c.* p. 37, pl. i, figs. 2 & 2a, n. sp.

Tramelia, n. g., type *Schizaspidia plagiata*, Walk.; Kirby, J. L. S. xx, p. 31.

Uromelia, n. g., type *Thoracantha striata*, Perty; Kirby, J. L. S. xx, p. 33.

Trichoxenia cineraria, Walk., Australia, Kirby, J. L. S. p. 35, pl. i, figs. 4 & 5 (n. sp. ?).

Stomatoceras magrettii, p. 35, pl. i, fig. 7, *diversicornis*, p. 36, pl. i, fig. 8, Kassala, Kirby, J. L. S. xx, n. spp.

Ormyrus quercus, andricus, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 128, n. spp.

Eupelmus auratus, p. 128, *dryorhizoxeni*, *sphaericephalus*, *cyaniceps*, *gemmarii*, p. 129, *quercus, zeli, dryophantæ*, p. 130, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 130, n. spp.

Blastothrix rosæ, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 130, n. sp.
Encyrtus bicolor, æneus, Sicily, Stef., Nat. Sicil. v, p. 182; *E. siphonophora*, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 131; *E. P insularis*, Hawaiian Islands, Cam., P. Manch. Soc. xxv, p. 182 : n. spp.

Pachyneuron syrphi, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 131, n. sp.

Copidosoma melanocephalum, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 131; n. sp.

Chiloneurus cupreicollis, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 131, n. sp.

Homalotylus lachni, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 132, n. sp.

Bothriothorax peckhami, N. America, Ashm., Tr. Am. Ent. Soc. xiii, p. 132, n. sp.

Coccophagus purpureus, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 132, n. sp.

Macroglenes dryorhizoxeni, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 133, n. sp.

Elachristus flavipes, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 133, n. sp.

Cirrospilus purpureus, Florida, Ashm., Tr. Am. Ent. Soc. iii, p. 133, n. sp.

Sympiezus flavipes, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 134, n. sp.

Gyrolasia nigrocyaneus, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 134, n. sp.

Tetrastichus lissonotus (parasitic on *Pieris brassicæ* in Europe), Möller, Ent. Tidskr. 1886, p. 83; *T. racemariæ, rosæ, acutus*, p. 134, *flavipes*, p. 135, Florida, Ashm., Tr. Am. Ent. Soc. xiii : n. spp.

Oryomorpha livida, Florida, Ashm., Tr. Am. Ent. Soc. xiii, p. 135, n. sp.

Pteromalus eminens, Först., reared from pupa of *Papilio machaon*; Bull. Soc. Ent. Fr. (6) v, p. clxxx.

P. sphegigaster, Sicily, Stef., Nat. Sicil. v, p. 183; *P. lazulinus, saturniæ, maculicornis, flaviscapus*, p. 266, *ruficornis, flaviventris*, p. 267, (*Rhopalicus*) *distinctus*, p. 268, Sicily, Rudow, t. c. ; n. spp.

Syntomopus pallipes, Sicily, Rudow, Nat. Sicil. v, p. 268, n. sp.

Dilophogaster, n. n. for *Tomocera*, How.; How., Ent. Am. ii, p. 98.

Ganosoma, Mayr, is the wingless ♂ of *Tetragonaspis*, Mayr, *G. robustum* being the ♂ of *T. flavicollis*, and *G. attenuatum* the ♂ of *T. gracilicornis*; Mull., P. E. Soc. 1886, p. x.

Tetragonaspis flavicollis and *Ganosoma robustum*, ? sexes of one species; Müller, Kosmos, xix, p. 68.

Physothorax disciger, Mayr, is the wingless ♂ of *Diomorus variabilis*, Mayr.; Müll., P. E. Soc. 1886, p. xi.

Nannocerus biarticulatus, Mayr, is apterous male of *Diomorus* sp. near *variabilis*; Müll., P. E. Soc. 1886, p. xi.

Heterandrium longipes, Mayr., is apterous ♂ of *Colyostichus longicaudis* and *H. nudiventre* that of *C. brevicaudis*; Müll., P. E. Soc. 1886, p. xi.

Blastophaga bifossulata and *brasiliensis*, habits noticed; Müll., Kosmos, xviii, pp. 57 & 58.

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Trichaulus versicolor and *Critogaster singularis* and *piliventris* discussed; Müller, Kosmos, xviii, pp. 55-62, and xix, pp. 54-56: *Critogaster* is the apterous ♂ of *Trichaulus*, *C. singularis* being ♂ of *T. versicolor*.

Dinocarsis thyridopterygis, Florida, Ashm., Canad. Ent. xviii, p. 97, n. sp.

Saccharissa, n. g., type *Eucharis contingens*, Walk., p. 37; the insect figured, pl. i, figs. 6, 6a, & 6b; Kirby, J. L. S. xx.

PROCTOTRUPIDÆ.

Belyta lativentris, p. 301, *forticornis*, p. 302, *moniliata*, p. 303, *mullensis*, p. 304, Scotland, Cameron, P. N. H. Soc. Glasg. (n.s.) i, n. spp.

Sierola monticola, p. 176, *leuconeura*, p. 177, Hawaiian Is., Cam., P. Manch. Soc. xxv, n. spp.

Proctotrupes ater parasitic on *Creophilus maxillosus*, with woodcut; Ent. xix, p. 225.

CYNIPIDÆ.

Cynips kollari; *Diomorus armatus* and *D. calcaratus* reared from its galls. *C. subterraneus*; *Torymus nobilis* bred from its galls: Wien. ent. Z. v, p. 307.

Dryophanta cornifex, Htg., galls of this yielded *Syntomaspis lazulina*, Först.; Wien. ent. Z. v, p. 307.

D. dugèsi, Mexico, Mayr., Verh. z.-b. Wien. xxxvi, p. 371, pl. xii, n. sp.

Neuroterus baccarum, Scottish galls of in 1884, Cameron (109).

Diastrophus piceus, Ottawa, Prov., Add. Hym. Queb. p. 161, n. sp.

Aulax jaceæ, Schk., *Lochites papaveris*, Först., is a parasite of this; Wien. ent. Z. v, p. 307.

Rhodites spinosissima, Gir.; *Oligosthenus stigma* is parasitic in its galls; Wien. ent. Z. v, p. 307.

Handlirsch, A. Die Metamorphose zweier Arten der Gattung *Anacharis*, Dalm.; Verh. z.-b. Wien. xxxvi, pp. 235-237, pl. vii, figs. 1-4. *A. typica* and *A. ensifera*.

Allotria ancylocera, p. 85, *maculicollis*, *basimacula*, p. 87, *caledonica*, p. 88, Scotland, Cam., Fauna ii, n. spp.

Kleditoma striata, p. 91, *picipes*, p. 92, Scotland, Cam., Fauna ii, n. spp.

SESSILIVENTRES.

[Cf. Cameron (107, 108, 110, 111), Costa (132), Jakowlew (330), Kirby (352, 353), Konow (363 to 368), Lethierry (398), Magretti (418), Mocsáry (457, 458), Provancher (562), Raymond (580), Stein (684, 685), Wustnei (751).]

SIRICIDÆ.

Of Hungary, Mocsáry (457).

TENTHREDINIDÆ.

The *Cephina* of Britain ; Cam., Ent. M. M. xxii, p. 175.

Cephus emichii, pp. 105 & xiv, *variabilis*, pp. 115 & xv, *vagabundus*, *similis*, pp. 117 & xvi, Hungary, Mocs., Rov. Lapok iii, n. spp.

Lyda harringtonii. Ottawa, Prov., Add. Hym. Queb. p. 17, n. sp.

Trichiosoma taylori, Vancouver, Prov., Add. Hym. Queb. p. 20, n. sp.

Cimbex americana, skin of larva of Minot (454).

Abia japonica, p. 269, *lewisii*, p. 270, Japan, Cam., P. N. H. Soc. Glas. (n. s.) i, n. spp.

Amasis, the entirely black species tabulated and described ; Konow, Wien. ent. Z. v, pp. 37 & 38.

A. helvetica, Switzerland, *meridionalis*, Greece, *caspica*, Caucasus, Konow, Wien. ent. Z. v, pp. 37 & 38 ; *A. atricapilla*, S.E. Europe, *caucasica*, Caucasus, Mocs., Ent. Nachr. xii, p. 2 : n. spp.

Labidia, n. g., next *Acordulecera*, for *L. columbiana*, Vancouver, n. sp. ; Prov., Add. Hym. Queb. p. 21.

Arge, Shrank, to be used in place of *Hylotoma*, Latr., Kon., Deutsche e. Z. xxx, p. 73 : *A. fuscipes*, Fall. = (*violacea*, Kl.), *A. hartigi*, n. n. for *fuscipes*, Kon., *A. atrata*, Först. = (*segmentaria*, Th.), *A. thomsoni*, Kon., to be cancelled, *id. l. c.*

A. monostega, Germany, Konow, Deutsche e. Z. xxx, p. 73, n. sp.

Hemidianeura cameroni, Rio Grande do Sul, Kirby, J. L. S. xx, p. 34, pl. i, fig. 10, n. sp.

Allantus distinguendus, Stein, ♂ described, p. 3, with n. var. *borrei*, Europe, p. 6, Stein, Ent. Nachr., p. 12 ; *A. obesus*, Mocs., and *quadricinctus*, Udl., colour varieties described, Bull. Soc. Ent. Ital. xviii, p. 27 ; *A. costatus* and *viduus*, discussed, ♂ of former described, *Tenthredo caucasica*, Eversm., referred to *Allantus*, Konow, Wien. ent. Z. v, pp. 39 & 40.

- *A. violascens*, Caucasus, Konow, Wien. ent. Z. v, p. 40 ; *A. excellens*, *fuscipennis*, p. 17, *reitteri*, p. 18, *nigritarsis*, p. 19, *longipes*, p. 20, *confinis*, p. 21, Caucasus, *brevicornis*, Helvetia, p. 18, *id. t. c.* ; *A. algeriensis*, Algeria, Magr., Bull. Soc. Ent. Ital. xviii, p. 27 ; *A. lituratus*, Caucasus, Mocs., Ent. Nachr. xii, p. 3 ; *A. breviventris*, Salonica, Cam., P. N. H. Soc. Glas. (n. s.) i, p. 277 : n. spp.

Sciapteryx algerina, *andreina*, Algeria, Magr., Bull. Soc. Ent. Ital. xviii, p. 28 ; *S. semenowi*, Crimea, Jak., Hor. Ent. Ross. xx, p. 240 : n. spp.

Tenthredo delta, Prov., variation of ; Harrington, Canad. Ent. xviii, pp. 32 & 33. *T. (Rhadinocerca) ventralis*, Panz., larva and egg, biological note ; B. E. Z. xxx, p. xix.

T. cunyi, Vosges, Konow, Rev. d'Ent. v, p. 137 ; *T. bimaculata*, p. 40, *lata*, p. 41, Caucasus, Konow, Wien. ent. Z. v : n. spp.

Tenthredopsis and *Thomsonia* discussed ; Konow, Wien. ent. Z. v, pp. 107 & 108.

Tenthredopsis. Synonymical remarks on some species of, e.g., *T. coqueberti*, Kl., = (*braunsii*, Kon.), and ♀ probably = (*ambigua*, Kl.) ; *T. albipluris*, n. n. for *dorsalis*, Lep. ; Kon., Deutsche e. Z. xxx, p. 79 ; *T. (sub Tenthredo) tarsata*, F., = (*opacipleuris*, Stein, and *Thomsonia hilleckeii*,

Kon.) ; Stein, Wien. ent. Z. v, p. 63. *T. thomsoni*, its synonymy discussed ; Konow, Wien. ent. Z. v, p. 107.

T. putoni, Switzerland, Konow, Wien. ent. Z. v, p. 108, n. sp.

Synaïrema pacifica, Vancouver, Prov., Add. Hym. Queb. p. 15, n. sp.

Macrophya (?) *saundersi*, Albania, Kirby, J. L. S. xx, p. 34, pl. i, fig. 11 ; *M. cora*, Albania, Kirby, Ann. N. H. (5) xviii, p. 497 : n. spp.

Pachyprotasis nigronotata, Kriechb., = (*formosa*, Schmied., = *viridis*, Brischke) ; Stein, Wien. ent. Z. v, p. 64.

Dolerus madidus, Kl., hermaphrodite ; Ent. Nachr. xii, p. 175. *D. tremulus*, Kl., = (*triplicatus*, Kl.), *uliginosus*, Kl., = (*lateritius*, Kl.), *madidus*, Kl., = (*lamprechti*, Kon.), *anthracinus*, Kl., = (*brachygaster*, Htg.) ; *D. æneus*, Htg., Zadd., with new variety discussed, *D. carinatus* = (*crassus*, Kon.), *nitens*, Zadd., = (*coracinus*, Htg.), *coracinus*, Kl., = (*cærulescens*, Htg.) : Konow, Deutsche e. Z. xxx, pp. 79-81.

D. bimaculatus, p. 267, *lewisii*, p. 268, Japan, Cam., P. N. H. Soc. Glasg. (n. s.) i, n. spp.

Eriocampa ethiops, F., = (*rosæ*, Cam.), synonymy discussed ; Konow, Wien. ent. Z. v, p. 109. *E. varipes*, cf. *Euryproctus sinister* ; *E. canina* cf. *Mesoleius canine* (*Ichneumonide*).

Selandria morio, F., synonymy discussed at length, = (*fabricii*, Kon.) ; Stein, Wien. ent. Z. v, pp. 62 & 63.

S. meridionalis, Rio Grande do Sul, Kirby, J. L. S. xx, p. 34, pl. i, fig. 12, n. sp.

Blennocampa : and allied genera tabulated ; Konow, Wien. ent. Z. v, pp. 183-185. European species of *B. tabulata*, and several noticed, pp. 214-218 ; *id. t. c.* *B. cinereipes*, Kl., synonymy discussed, with *B. confusa*, n. n. for *B. cinereipes*, Htg. ; Kon., Deutsche e. Z. xxx, pp. 81 & 82. *B. melanocephala*, color var. ; Magr., Bull. Soc. Ent. Ital. xviii, p. 26.

B. intermedia, Lippiza, Kriechb., CB. Ver. Regensb. xxxix, p. 143 ; *B. puncticeps*, Switzerland, Konow, Wien. ent. Z. v, p. 216 : n. spp.

Mesoneura, its European species tabulated ; *T. arquala*, Kl., and *despecta*, Htg., noticed ; Konow, Wien. ent. Z. v, p. 185.

Periclista, n. g., near *Mesoneura*, for *melanocephala*, F., and others ; Konow, Wien. ent. Z. v, p. 186.

Pareophora, n. g., near *Blennocampa*, for *luridiventris*, Kl., and *exarata*, Th. ; Konow, Wien. ent. Z. v, p. 187.

Ardis, n. g., near *Blennocampa*, for *plana* and *bipunctata*, Kl., and *sulcata*, Cam. ; Konow, Wien. ent. Z. v, p. 188.

Rhadinoceræa, n. g., p. 211, for *R. hyalina*, Switzerland and Carinthia, p. 211, *nodicornis*, Croatia, p. 212, n. spp., and others ; Konow, Wien. ent. Z. v.

Tomostethus, n. g. for *B. nigritus* and 5 other species of *Blennocampa* as given in table ; Konow, Wien. ent. Z. v, p. 214.

Entodecta, n. g., p. 243, near *Blennocampa*, for *pumilio*, Kl., and *E. decolor*, Mecklenburg, n. sp., p. 244 ; Konow, Wien. ent. Z. v.

Monopadnus, Htg., species tabulated, and some noticed, Konow, Wien. ent. Z. v, pp. 243-246 ; *M. elongatulus*, Kl., and *longicornis*, Htg., described, pp. 267 & 268 ; *M. dispar*, North Germany, *id. t. c.* p. 267, n. sp.

Emphytus viennensis, variation of neuration; Magr., Bull. Soc. Ent. Ital. xviii, p. 25. *E. tener*, var. of neuration; *id. t. c.* p. 26.

E. hullensis, Canada, Prov., Add. Hym. Queb. p. 25, n. sp.

Aneugmus, Htg., position and extent of, discussed; Konow, Wien. ent. Z. v, p. 110.

A. brunneus, Lombardy, Magr., Bull. Soc. Ent. Ital. xviii, p. 25, n. sp.

Kaliosysphinga, Tischb., European species tabulated; Konow, Wien. ent. Z. v, pp. 269 & 270.

Fenusa, European species tabulated; *F. thomsoni*, n. n. for *pumilio*, Th.: Konow, Wien. ent. Z. v, p. 270.

Phænusa ticinensis, Lombardy, Magr., Bull. Soc. Ent. Ital. xviii, p. 25, n. sp.

Fenella, the European species tabulated; Konow, Wien. ent. Z. v, p. 271.

Athalia: scutellariae, Cam., discussed, and tabulation of other species with some synonymy given, pp. 76 & 77; *A. paradoxa*, Switzerland, p. 78, n. sp.; Konow, Deutsche e. Z. xxx. *A. spinarum*, Fab., ravages; Orm., Rep. x, pp. 81-84.

Lophyrus pini, note on the frass of the larvæ; Bull. Soc. Ent. Fr. (6) v, p. ccvii.

L. abietis, Bohemia, Stein, Wien. ent. Z. v, p. 141, n. sp.

Camponiscus tscheki, Austria; Rog. & Kohl., Hernstein, Fauna, p. 634, n. sp.

Cladius and its species discussed; Stein, Ent. Nachr. xii, pp. 22-29 & 33-40. *C. difformis*, Panz., = (*gracilicornis*, Kon.); Kon., Deutsche e. Z. xxx, p. 75.

Cladius hyalinopterus, Centr. Europe, Kon., Deutsche e. Z. xxx, p. 75, n. sp.

Priophorus brullei, characters and synonymy noticed; Konow, Deutsche e. Z. xxx, p. 75.

Leptopus, Hart., to be used for *Camponiscus*, Newm. *L. luridiventris*, Fall., = (*rufipes*, Först.), *L. apicalis*, Brischke, = (*braunsi*), *L. luridus*, Kon., ♂ described; Konow, Deutsche e. Z. xxx, p. 76.

Dineura nigro-flava, Lombardy, Magr., Bull. Soc. Ent. Ital. xviii, p. 24, n. sp.

Nematus ribesii, biology, Raymond (580). *N. erichsoni*, ravages; Nat. Canad. xv, pp. 45-53.

N. sardiniensis, Sardinia, Costa, Rend. Acc. Nap. xxv, p. 53, n. sp.

(c.) *LEPIDOPTERA.*

Wing-neuration, Redtenbacher (581, pp. 198–204, pls. xvi pt., xvii pt.).—Tropi ; Walter, (721) and summary, J. R. Micr. Soc. (2) vi, p. 428.—Structure of thorax ; Cholodkovsky (122).—Note on odoriferous organs ; Landois, JB. westf. Ver. 1885, p. 34.—Sense of smell ; Vangel (710).—Spermatozoa ; Gilson (243).—Formation of egg ; Stuhlmann (690).—Blood-tissues ; Wielowiejski (736, p. 533).—Pigmentation of larvæ, pupation, &c. ; Poulton (560).—Variation ; Teich (695).

Classification ; Plötz (555).

Albinism ; Gadeau (222).—Disease in caterpillars and *Bacteria* ; Ent. Nachr. xii, p. 270.—Hosts of *Ichneumonidæ* ; Mocsáry (456), Möller (460).

List of insects exhibited alive in insect-house of the Zoological Society of London ; P. Z. S. 1886, pp. 2–4.

RHOPALOCERA.

[*Cf.* Aitken (2), Behr (42), Buckler (88), Butler (91, 92, 94, 96, 98, 99), Capronnier (114), Dewitz (139, 140), Distant (142, 143, 144), Doherty (147, 148), Edwards (162, 163), Frivaldsky (217), Godman & Salvin (247), Grandidier (255), Guillemard (263), Haase (268, 269), Holland (296), Honrath (302, 303, 304), Jordan (334), Mathew (424), Maynard (428), Millière (451), Minot (454), Moore (464), Möschler (470), Müller (475, 476), Nicéville (482, 483, 484), Oberthur (491, 492), Olliff (504), Plötz (556), Poujade (559), Ribbe (605), Riley (610), Röber (614), Schilde (633), Semper (654), Smith (663, 664), Staudinger (680, 682), Swinhoe (693).]

Duration of life of butterflies in summer ; JB. westf. Ver. 1885, p. 30.

List of butterflies from which he obtained eggs in captivity ; Gatter, Ent. Nachr. xii, pp. 135 & 136.

Note on special forms of scales of butterflies ; Haase, Ent. Nachr. xii, p. 312.

Staudinger's Exotische Schmetterlinge noticed by Van Segvelt, C.R. ent. Belg. 1886, pp. x–xiv, with remarks on geographical distribution and mimicry.

PAPILIONIDÆ.

Ornithoptera : scent-organs of ♂ in *priamus* and *pompeus* groups ; Haase, CB. Iris, pp. 93 & 94. *O. priamus* var. *poseidon*, variation of ; Capronnier, Ann. Ent. Belg. xxx, p. 1.

Papilia : scent-organs of *nox*, *coon*, *polydorus*, *ulysses*, *peranthus*, *macareus*, *antiphates*, and *euryphilus*-groups ; Haase, CB. Iris, pp. 94–97. *P.*

machaon, larva and pupa figured; Buckler, Larv. Brit. p. 1, pl. i, fig. 1: development in egg, &c.; Goossens, Bull. Soc. Ent. Fr. (6) v, p. clxxxi: var. *centralis* described; Staud., S. E. Z. xlvii, p. 193. *P. feisthamelii* var.; Bull. Soc. Ent. Fr. (6) vi, p. clxv. *P. ajax*, migration of; Am. Nat. xx, p. 976. *P. troilus*, *cinyras*, and *ajax* taken at Monaco; Mill., Nat. Sicil. v, p. 243. *P. helenus* n. var. *antaphernes*, Bangkai, Celebes, p. 295; *P. pomponius*, Hopf., noticed and figured, p. 296, pl. vi, fig. 4; Hour., B. E. Z. xxx. *P. gundlachianus*, Feld., ♀ described and figured; *id. t. c.* p. 131, pl. iv, fig. 5. *P. laglaizei*, Dep., ♂ described; Capr., Ann. Ent. Belg. xxx, p. 3. *P. turnus*, var. and undeveloped ex.; Fernald, Canad. Ent. xviii, p. 50. *P. asterias*, Fab., variation of; Tepper, Ent. Am. i, p. 186. *P. albolineatus*, Forbes, figured; Waterh., Aid, pl. 166, fig. 1. *P. nephelus* var. *saturnus*, ♀, = (*albolineatus*, Forbes); Dist., Rhop. Mal. p. 468. *P. megarus*, pl. xlii, fig. 9, *agetes*, fig. 8, *anticrates*, var., fig. 7, figured; *id. t. c.* *P. cresphontes* var. *oviedo*, note on; Gundlach., B. E. Z. xxx, p. 132. *P. anchisiades* pupa; Ernst., Ent. Nachr. xii, p. 79.

P. rex, Mhonda, *taboranus*, Tabora, Ch. Oberth., Bull. Soc. Ent. Fr. (6) vi, p. cxv; *P. egertoni*, Perak, Dist., Ann. N. H. (5) xvii, p. 251 [but *P. sycorax*, Smith, = (*egertoni*, Dist.), Dist., Rhop. Mal. p. 468], the insect figured, *t. c.* pl. xlii, fig. 10; *P. paphus*, Sikkim, Nicér., J. A. S. B. lv. p. 254, pl. xi, fig. 6; *P. adamsoni*, p. 149, *mehala*, p. 150, Burmah, Smith, Ann. N. H. (5) xviii. *P. syfanius*, pl. i, fig. 3, *chentsong*, pl. i, fig. 1, Thibet, Oberth., Études d'Ent. xi, p. 13; *P. kuhni*, Celebes, Hour., B. E. Z. xxx, p. 294, pl. vi, figs. 1 & 1a; *P. doubledayi* var. *sambilanga*, Nicobar Is., Doh., J. A. S. B. lv, p. 263; *P. eutropius*, New Guinea, Janson; Cruise of the Marchesa, ii, p. 85; *P. parkinsoni*, New Pomerania, Hour., B. E. Z. xxx, p. 129, pl. iv, fig. 1; *P. xenophilus*, *erskinei*, pl. xxxiv, fig. 1, p. 348, *bridgei*, fig. 2, p. 349, *hicetaon*, p. 350, Solomon Is., Mathew, P. Z. S. 1886: n. spp.

Araminta, n. g., for the *P. demolition* group of *Papilio*; Moore, J. L. S. xxi, p. 50.

Pangerana, n. g., for part of the *P. nox* group of *Papilio*; Moore, J. L. S. xxi, p. 51.

Thais polyxena, var. described and figured; Ann. Soc. Ent. Fr. (6) vi, p. 5, pl. i, fig. 1.

Leptocircus meges, pl. xxxii, fig. 3, *curius*, pl. xlii, fig. 1, figured; Dist., Rhop. Mal.

Calinaga buddha, Moore, ♂ figured, frontisp., fig. 122, = (*brahma*, Butl.), p. 143; Nicév., Butt. Ind. ii.

Parnassius: pouch of, distribution of the species, classification, larvæ, habits, synonymy, &c.; Elwes (165). *P. apollo*, copulation of; Thomson, P. Z. S. 1886, pp. 12-14. *P. apollo*, *delius*, noticed; B. E. Z. xxx, p. iii: intermediate form; Frey, M.T. schw. ent. Ges. vii, p. 256. *P. glacialis*, *citrinarius*, *stübendorffii* noticed; B. E. Z. xxx, p. xxv. *P. discolobus* var. *insignis*, *P. delphius* varr. *infernalis*, *styx*, *namaganus*, *P. mnemosyne* var. *gigantea* described; Staud., S. E. Z. xlvii, pp. 194-197. *P. imperator*, Oberth., ♂ described; Oberth., Études d'Ent. xi, p. 15.

P. széchenyii, Thibet, Friv., Term. füzetek. x, p. 39, pl. iv, figs. 1 & 1a, n. sp.

PIERIDÆ.

Scent-organs of ♂ in several genera noticed ; Haase, CB. Iris, pp. 97 & 98.

Leucophasia sinapis, larva and pupa ; Buckler, Larv. Brit. p. 25, pl. iii, fig. 3.

Tachyris celestina, B., variation described ; Ribbe, CB. Iris, pp. 79 & 80.

Delias belladonna, Fab. : note on, with reference to variation, distribution, and synonymy of it, and *D. horsfieldii*, Gray, = (*hearseyi*, *boylei*, Butl.); Elwes, Ann. N. H. (5) xvii, pp. 157-161. *D. pyramus*, pl. xlii, fig. 14, *descombesi*, fig. 16, figured ; Dist., Rhop. Mal.

D. kandha, *ethire*, Madras, Doh., J. A. S. B. lv, p. 262 ; *D. kühni*, Island of Bangkai, Celebes, Honr., B. E. Z. p. 295, pl. vi, fig. 2 ; *D. ribbei*, Aru Islands, Röber, CB. Iris, p. 46, pl. ii, figs. 3 & 4 ; *D. discus*, New Guinea, Honr., B. E. Z. xxx, p. 130, pl. iv, fig. 4 : n. spp.

Rhodocera cleopatra variety of ; Bull. Soc. Ent. Fr. (6) vi, p. clxv.

Gonepteryx rhamni, larva and pupa figured, &c. ; Buckler, Larv. Brit. p. 145, pl. i, fig. 2.

Colias edusa, larva and pupa described and figured, p. 9, pl. i, fig. 3 : *hyale*, p. 16 ; Buckler, Larv. Brit. Algerian variety described ; Bull. Soc. Ent. Fr. (6) vi, p. lxxi. *C. hyale* var. *alta* described ; Staud., S. E. Z. xlvii, p. 200. *C. edusina*, Feld., *erate* and *sareptensis*, noticed ; Butl., P. Z. S. 1886, pp. 370 & 371.

C. montium, Thibet, Oberth., Études d'Ent. xi, p. 16, pl. vi, fig. 1, n. sp.

Terias hecabe and other Indian species noticed ; Butl., P. Z. S. 1886, p. 372. *T. senna*, Feld., p. 213 (cf. Dist., t. c. p. 379), *zoraide*, Feld., *drona*, Horsf., *lisa*, Bois., *brigitta*, Cr., p. 214, *attenuata*, Moore, p. 215, *fimbriata*, Wall., p. 216, *boisduvaliana*, Mab., p. 217, *æsioppe*, Men. (cf. Dist., t. c. p. 380), *sulphurata*, Butl., p. 219, *hecabe*, L., *phanospila*, Feld., *excavata*, Moore, *hecabeoides*, Men., p. 220, *sari*, Horsf., n. 221 (cf. Dist., t. c. p. 280), *celebensis*, Wall., p. 224, *jægeri*, Men., p. 225, noticed by Butl., Ann. N. H. (5) xvii (cf. also *id.* t. c. p. 468).

T. hespera, N.E. Australia, p. 214, *moorei*, Camoeta, pl. v, fig. 1, *swinhoei*, E. India, p. 216, *simplex*, N.W. Himalaya, pl. v, fig. 2, p. 217, *templetonii*, Ceylon, *ceres*, Mauritius and S. Africa, pl. v, fig. 3, p. 218, *phæbus*, Queensland, pl. v, fig. 4, *latilimba*, Sumatra, pl. v, fig. 5, p. 221, *bidens*, pl. v, fig. 7, *semifusca*, pl. v, fig. 8, Sumatra, *leonis*, Sierra Leone, pl. v, fig. 6, p. 222, *gradiens*, Borneo, pl. v, fig. 9, p. 223, *anguligera*, Tondano, pl. v, fig. 10, p. 224, Butl., Ann. N. H. (5) xvii ; *T. lacteola*, Singapore, p. 466, fig. 129, Dist., Rhop. Mal. ; *T. sodalis*, p. 45, *contubernalis*, *patrue-lis*, pl. iv, fig. 5, *fraterna*, fig. 6, p. 46, *merguiana*, fig. 7, *andersonii*, fig. 8, p. 47, *kana*, fig. 9, p. 48, Mergui, Moore, J. L. S. xxi : n. spp.

Appias aperta, n. n. for *A. vacans*, Moore (*neo* Butl.) ; Butl., Ann. N. H. (5) xviii, p. 188. *A. lagela*, Moore, figured, pl. xli, fig. 11 ; Dist., Rhop. Mal.

Belenois lordaca, Walk., and *mesentina* noticed ; Butl., P. Z. S. 1886, p. 375. *B. mesentina*, Cr., its variation noticed ; Swinh., t. c. p. 430.

B. auriginea, India, Butl., P. Z. S. 1886, p. 375, n. sp.

Synchlœ distorta, Somali, Butl., P. Z. S. 1885, p. 774, pl. xlvii, fig. 12, n. sp.

Herpænia melanarge, Somali, Butl., P. Z. S. 1885, p. 774, n. sp.

Nepheronia arabica, on the inconstancy of a generic character in ; Butl., Ent. M. M. xxii, p. 259.

Pieris brassicæ ; *Apanteles jucundus*, Marsh, is parasite of ; P. S. Lond. E. S. 1886, p. 63 : parasites of ; Möller, Ent. Tidskr. 1886, pp. 81-85 : *brassicæ*, larva and pupa, p. 148 (Hellins), pl. ii, fig. 2, *rapæ*, pp. 19 & 152, pl. ii, fig. 3, *napi*, pp. 20 & 156, pl. ii, fig. 4, *daphnidice*, p. 21, pl. iii, fig. 1, larvæ and pupæ described and figured ; Buckler, Larv. Brit. *P. rapæ*, contagious disease of ; Forbes, Bull. Illin. Lab. ii, p. 260, &c. pl., figs. 1 & 2. *P. napi*, ab. *bryoniae* variation described ; Wocke Z. Ent. Bresl. (2) xi, p. xxiii. *P. martinetti*, Oberth., n. var. *kreitneri*, Thibet ; Friv., Term. füzetek, x, p. 40, pl. iv, fig. 2. *P. krueperi* var. *prisca* ; *P. canidia* var. *palaearctica* described ; Staud., S. E. Z. xlvii, p. 198.

Pieris ochsenheimeri, Stgr., Central Asia, Staud., S. E. Z. xlvii, p. 199, (n. sp. ?) ; *P. acræa*, Thibet, Ch. Oberth., Bull. Soc. Ent. Fr. (6) v, p. ccxxvi (figured Études d'Ent. xi, pl. ii, fig. 7) ; *P. goutellei*, Thibet, Oberth., Études d'Ent. xi, p. 15, pl. ii, fig. 11 : n. spp.

Ganoris nipalensis, larva noticed ; P. Z. S. 1886, p. 376.

G. wollastoni, Madeira, Butl., Ann. N. H. (5) xvii, p. 430, n. sp.

Mancipium, application of the name ; Butl., P. Z. S. 1886, p. 375.

Aporia crategi, larva and pupa figured, &c. ; Buckler, Larv. Brit. pl. ii, fig. 1. *A. hippia* and *carra*, note on ; Butl., P. Z. S. 1886, pp. 80 & 81.

Ixias pygmæa, Moore, noticed ; Butl., P. Z. S. 1886, p. 374.

Euchloë lucilla, India, Butler, P. Z. S. 1886, p. 376, pl. xxxv, fig. 4, n. sp.

Anthocharis cardamines, larva and pupa figured, &c. ; Buckler, Larv. Brit. p. 159, pl. iii, fig. 2. *A. eupheno* n. var. *androgyne*, Mogador ; Leech, P. Z. S. 1886, p. 122. *A. bieti*, Oberth., figured ; Oberth., Études d'Ent. xi, pl. vi, fig. 39.

Teracolus : for synonymy of species of this, of *Idmais*, and of *Callosune*, figured by Staudinger, Exot. Schmett., cf. Butler, Ent. M. M. xxiii, p. 31. *T. protomedia*, *amina* and its allies, *dedecorus*, and others, noticed ; Butl., P. Z. S. 1885, pp. 767-773. *T. dynamene*, ♀, Mab., is not really such, but is ♀ of *T.* (sub *Idmais*) *castalis*, Stdgr. ; *id. t. c.* p. 767. *T. miriam* = (*Anthocharis eucheria*, Mab.) ; *id. t. c.* p. 769. *T. protractus*, *faustinus*, *farrinus*, *bimbura*, *purus* noticed ; *id. op. cit.* 1886, p. 374.

T. callidia, Zanzibar, Smith, Ent. M. M. xxiii, p. 32 ; *T. johnstoni*, Graham's Town, p. 29, *opalescens*, Delagoa Bay, p. 30, Butl., Ent. M. M. xxiii ; *T. ocellatus*, p. 767, *heliocaustus*, p. 768, pl. xlvii, figs. 8 & 9, *præclarus*, fig. 7, p. 769, *complexivus*, p. 770, *thruppi*, fig. 10, *jamesi*, p. 771, *philippsi*, fig. 11, p. 772, Somali, Butl., P. Z. S. 1885 : n. spp.

Mylothris sagala, Zanzibar, Smith, Ent. M. M. xxiii, p. 32, n. sp.

DANAIDÆ.

Hestia : Semper figures and describes *electra*, Semp., pl. i, figs. 1 & 2, *leuconœ*, Er., figs. 3, 4, & 5, Reise Philipp. v. *H. lynceus* = (*reinwardti*,

logani, *donovani*, Moore), p. 405 ; *H. leuconoe*, Er., figured, pl. xxxix, fig. 3 ; Dist., Rhop. Mal.

Scent-organs of *Danaïs*, *Euplœa*, *Hestia*, and *Ideopsis* noticed ; Haase, CB. Iris, pp. 99 & 100.

Danaïs archippus, an enterprising butterfly ; Nature, xxxii, p. 467 : n. var. *fumosus* ; Hulst, Ent. Am. ii, p. 182. *D. ismare*, Cr., hermaphrodite ; Haase, CB. Iris, p. 36, pl. iii a, figs. 2a, 2b, Ca, & Cb. *D. chrysippus* var. *alcippoides*, pl. xl, fig. 13, *tytia*, var., pl. xli, fig. 15, *abigar*, pl. xlii, fig. 11, figured ; Dist., Rhop. Mal. *D. erippus*, Cr., p. 659, *plex-aure*, God., p. 661, metamorphoses ; Müller, Zool. JB. i. *D. cleophile*, God., a valid species, characters of ; Mösch., Abh. senck. Ges. xiv, p. 27, sep. pag.

D. vorkeinus, Aru Is., Röber, CB. Iris, p. 46, pl. ii, fig. 1 ; *D. (Tirumala) gautamoides*, Nicobar Is., Doh., J. A. S. B. lv, p. 257 : n. spp.

Anosia, Hub. : Under this name Semper unites *Salatura*, *Nasuma*, *Tasitia*, and *Limnas*, Moore ; Reise Philipp. p. 10. *A. chrysippus*, L., larva and pupa figured, pl. A, fig. 2 ; *A. lotis*, Cr., figured, pl. iii, figs. 3, 4, & 5, *t. c.* *A. plexippus*, L., a study in geographical distribution, Walker, Ent. M. M. xxii, pp. 217-224 ; woodcut, Ent. xix, p. 25.

Ideopsis : Semper figures *anapis*, Feld., fig. 1, *glaphyra*, Moore, pl. ii, figs. 2 & 3 ; Reise Philipp. v.

Radena : Semper gives outline figures of the wings of, and allied genera, to show neurulation and secondary male characters ; Reise Philipp. v, p. 9. *R. juvena*, pl. xxxix, fig. 4, figured, Dist., Rhop. Mal. ; larva and pupa figured, pl. A, fig. 7. *R. luzonica* figured and described, pl. ii, figs. 4 & 5 ; Semper, Reise Philipp. v.

Parantica, Moore : Semper merges in this *Ravadeba*, *Bahora*, *Phirdana*, *Asthupa*, and *Mangulisa*, Moore ; Reise Philipp. p. 8. *P. phyle*, Feld., figured, pl. ii, figs. 6 & 7 ; *t. c.*

Chittira, Moore : *Caduga*, Moore, merged in this ; Semp., Reise Philipp. v, p. 8. *C. luzonensis*, Feld., figured, pl. ii, figs. 8 & 9 ; *t. c.*

Tirumala, Moore : *Melinda*, Moore, merged in this ; Semp., Reise Philipp. v, p. 10. *T. limniace*, Cr., pl. ii, figs. 12 & 13, *orientalis*, Semp., pl. ii, figs. 10 & 11, figured ; *id. t. c.*

T. tumanana, Philippines, Semp., Reise Philipp. p. 15, pl. iii, figs. 1 & 2, n. sp.

Euplœa callithoë, Bdv., var. *fucosa* (*E. mesocala*, Voll., ♀ ?) described ; Janson, Cruise of the Marchesa, ii, p. 374. *E. vestigiata* = (*Salpinx luzulina*, Moore), *E. crassa* = (*Pudemma apicalis*, Moore), p. 410 ; *E. marsdeni*, Moore, figured, pl. xxxix, fig. 1 ; Dist., Rhop. Mal. Semper figures *E. althaea*, pl. vi, figs. 1, 2, & 3, *monilis*, pl. vi, figs. 4 & 5 ; Reise Philipp. v.

E. (Trepisichrois) kalinga, Madras, Doh., J. A. S. B. lv, p. 256, n. sp.

Trepisichrois : Semper figures and describes *megilla*, pl. v, fig. 7, pl. A, fig. 3, larva and pupa, *semperi*, pl. v, fig. 1, *kochi*, pl. 5, fig. 6. *T. visaya*, p. 27, pl. 5, figs 2 & 3, *mindanaensis*, p. 28, pl. v, figs. 4 & 5, Philippines, n. spp. : Reise Philipp. v.

Tronga cratis, Butl., figured, pl. iii, figs. 6 & 7 ; Semp., Reise Philipp. v.

Crastia : Semper figures *swainsonii*, pl. iv, figs. 7 & 8, *lucasi*, figs. 9 & 10, *snelleni*, pl. iii, figs. 10 & 11, *tobleri*, figs. 8 & 9 ; Reise Philipp. v.

Stictoplea dufresnii figured, pl. vi, figs. 6, 7, & 8, (= *latifica*, Butl.), p. 23 : Semp., Reise Philipp. v.

Salpina : Semper figures *kadu*, pl. v, figs. 8, 9, & 10, *simillima*, pl. iv, figs. 1, 2, & 3, *meldolæ*, pl. iv, figs. 4, 5, & 6 ; Reise Philipp. v.

Limnas klugii, n. n. for *Euplæa dorippus* var., Klug, Symb. Phys, pl. 48, fig. 5 ; Butl., P. Z. S. 1885, p. 758. *L. dorippus*, geographical range noted ; *id. t. c.* p. 758. *L. alcippoides* and *klugii* noticed ; *id. t. c.* p. 356.

Thyridia themisto, Hb., metamorphoses ; Müller, Zool. JB. i, p. 662, pl. xv, fig. 22 ; larva and pupa described, Berg., An. Soc. Arg. xxi, p. 278.

Ceratinia eupompe, Hb., larva noticed ; Müller, Zool. JB. i, p. 662.

Ithomia neglecta, Stdgr. (M.S.), metamorphoses noticed, Müller, p. 662, pl. xv, fig. 15 ; Zool. JB. i.

Dircenna xantho, Feld., metamorphoses ; Müller, Zool. JB. i, p. 661.

Mechanitis lysimnia, Fab., metamorphoses ; Müller, Zool. JB. i, p. 664.

ACRÆIDÆ.

Acraea pellenea, Hb. : metamorphoses fully described, *anteas*, Doubl., larva ; Müller, Zool. JB. i, pp. 424-428, pl. xv, fig. 1.

A. mirabilis, Somali, Butl., P. Z. S. 1885, p. 760, pl. xlvii, fig. 1 ;

A. fumigata, New Pomerania, Honr., B. E. Z. xxx, p. 130, pl. iv, fig. 3 : n. spp.

HELICONIIDÆ.

Heliconius apseudes, p. 428, pl. xv, fig. 2, and *eucrate*, Hb., p. 429, metamorphoses described, *doris*, L., pupa noticed, p. 430 ; Müller, Zool. JB. i.

Euclides isabella, Cr., p. 430, pl. xv, fig. 3, *aliphera*, God., p. 432, metamorphoses, *pavana*, Men., egg noticed ; Müller, Zool. JB. i.

NYMPHALIDÆ.

Protection in larvæ of *Nymphalidæ*, &c., &c., Müller, W. (475, 476).

Scent organs of *Terinos*, *Cirrochroa*, *Cynthia*, and *Argynnis*, *Euthalia*, *Symphædra*, and *Prothoe*, noticed ; Haase, CB. Iris, pp. 101 & 102.

Colenis dido, L., p. 433, pl. xii, fig. 12, *julia*, Fab., p. 435, metamorphoses ; Müller, Zool. JB. i.

Cethosia biblis, figured, pl. xxxviii, fig. 3, Dist., Rhop. Mal. : pupa noticed, Müller, Zool. JB. i, p. 440. *C. myrina*, Feld., n. var. *ribbei*, Bangkai, Celebes ; Honr., B. E. Z. xxx, p. 296. *C. mahratta* ♀, Moore, figured pl. xxii, fig. 98 ; Nicév., Butt. Ind. ii.

Cirrochroa rotundata, ♀ figured, pl. xli, fig. 12 ; Dist., Rhop. Mal. *C. nicobarica*, ♀ described ; Doh., J. A. S. B. iv, p. 258.

C. olivacea, Upper Tenasserim, p. 110, pl. xxiv, fig. 111 ; *relata*, S. India, p. 116 ; Nicév., Butt. Ind. ii : n. spp.

Terinos clarissa, ♂, Boisd., figured, pl. xxiii, fig. 101 ; Nicév., Butt. Ind. ii.

Lachnoptera laodice, Cr., dimorphic females described and one figured ; Holl., Tr. Am. Ent. Soc. xiii, p. 326, pl. ix, fig. 2.

Atella sinha, Koll., pl. xx, fig. 87, *phalanta*, Dr., fig. 88, figured ; Nicév., Butt. Ind. ii.

Paduca, n. g., type *Atella fasciata*, Feld., Moore, J. L. S. xxi, p. 34 : the insect figured, Dist., Rhop. Mal. pl. xl, fig. 12.

Argynnis paphia, larva and pupa, p. 58, pl. x, fig. 1, *adippe*, p. 65, pl. x, fig. 2, *aglaia*, p. 71, pl. x, fig. 3, *selene*, p. 73, pl. xi, fig. 1, *euphrosyne*, p. 77, pl. xi, fig. 2 ; Buckler, Larv. Brit. *A. selene*, variation ; Wocke, Z. Ent. Bresl. (2) xi, p. xv. *A. jerdoni*, Lang. = (*cashmirensis*, Moore) ; *A. kamala*, Moore = (*enidia*, Feld.), p. 135 ; *A. rudra*, Moore, ♂, pl. xviii, fig. 75, *sipora*, Moore, ♂ ♀, fig. 72, figured ; Nicév., Butt. Ind. ii. *A. issæa*, Gray, characters of ; Doh., J. A. S. B. lv, p. 121. *A. pales*, var. *generator* ; *A. hecate*, var. *alaica* ; Staud., S. E. Z. xlvii, pp. 235 & 236.

A. semiramis, California, p. 61, *cypriis*, Arizona, &c., p. 62, Edw., Canad. Ent. xviii, n. spp.

Melitæa artemis, larva, prothoracic gland of ; Poulton, Tr. Ent. Soc. 1886, p. 158. *M. artemis* and *parthenia*, melanic and albinic varieties of at Rennes noticed ; Bull. Soc. Ent. Fr. (6) v, p. cexv. *M. dejone*, *parthenie*, melanic varieties ; *op. cit.* vi, p. clxvi. *M. athalia*, variations of ; Kane, Ent. xix, p. 145. For descriptions of named varieties from Central Asia see Staud. ; S. E. Z. xlvii, pp. 230-235. *M. balbita*, Moore, figured, pl. xviii, fig. 21 ; Nicév., Butt. Ind. ii. *M. perseæ*, noticed ; Butl., P. Z. S. 1886, p. 362. *M. aurinia*, Rott., pupa noticed ; Müller, Zool. JB. i, p. 446. *M. cinzia*, pl. xi, fig. 3, *athalia*, p. 81, pl. xii, fig. 1, *artemis*, p. 84, pl. xii, fig. 2, larvæ and pupæ ; Buckler, Larv. Brit.

M. acraïna, Central Asia, Staud., S. E. Z. xlvii, p. 223 ; *M. jezebel*, pl. ii, fig. 14, *yuenty*, pl. ii, fig. 13, p. 17, *agar*, pl. v, figs. 31 & 32, p. 18, Thibet, Oberth., Etudes d'Ent. xi ; *M. wrightii*, California, Edw., Canad. Ent. xviii, p. 64 : n. spp.

Phyciodes (n. sp. ?), larva, p. 444, *langsdorfi*, Godt., pupa, p. 445, pl. xv, fig. 4 ; Müller, Zool. JB. i.

Symbrenthia asthala and *hysudra*, Moore ; females described ; Doh., J. A. S. B. lv, p. 123. *S. asthala*, Moore, ♂ figured, pl. xxiii, fig. 106 ; Nicév., Butt. Ind. ii. *S. hypoclus*, pl. xlii, figs. 4 & 5, *hypatia*, fig. 6, figured ; Dist., Rhop. Mal. *S. hypoclus*, Cr., = (*daruka*, Moore) ; Nicév., Butt. Ind. ii, p. 241.

Hypanartia lethe, Doubl., metamorphoses ; Müller, Zool. JB. i, p. 441, pl. xv, fig. 6.

Vanessa : mode of production of metallic colour in pupa ; Poulton, P. E. Soc. 1886, p. xlvi. *V. cardui* ab. *inornata*, Russ. mer. ; Bramson, Ann. Soc. Ent. Fr. (6) vi, p. 284. *V. atalanta*, p. 176, pl. viii, fig. 2, *io*, p. 179, pl. viii, fig. 3, *antiopa*, p. 52, pl. viii, fig. 4, *polychloros*, p. 54, pl. ix, fig. 1, *urticæ*, pp. 55 & 181, pl. ix, fig. 2, larvæ and pupa of ; Buckler, Larv. Brit. *G. c-album*, larva and pupa ; *id.* pl. ix, fig. 13, and pp. 57 & 182. *V. antiopa* var. *lintneri* figured ; Maynard, Butt. New Engl. pl. ii, fig. 18b. *V. xanthomelas*, W. V., ♂ figured, pl. xviii, fig. 73 ; Nicév., Butt. Ind. ii. *V. c-album*, L., = (*Grapta agnicula*, Moore) ; *id. t. c.*

Vanessa perakana, Perak, pl. xl, fig. 1, p. 430, Dist., Rhop. Mal., n. sp.

Cynthia cardui, larva and pupa ; Buckler, Larv. Brit. pp. 49 & 174 pl. viii, fig. 1. *C. erota*, Fab., ♂ ♀, figured, pl. xxi, fig. 97 ; Nicév., Butt. Ind. ii.

C. saloma (Swinh. MS.), Nilgiri Hills, Nicév., Butt. Ind. ii, p. 43, n. sp.

Junonia asterie and *almana*, L., are not seasonal forms ; Moore, J. L. S. xxi, p. 34.

Papilio ænone, Cr., is not *P. ænone*, L., and the species should therefore be called *Junonia hierta*, Fab., p. 72 : ♂ ♀ figured, pl. xx, fig. 94 ; Nicév., Butt. Ind. ii. *P. ænone*, L., to be used for the African *P. clelia*, Cr., *id. l. c.*

Pyrameis indica, Hbst., ♀ figured, pl. xviii, fig. 74 ; Nicév., Butt. Ind. ii. *P. myrinna*, Doubl., metamorphoses ; Müller, Zool. JB. i, p. 443.

Precis iphita, Cr., ♂ figured, pl. xix, fig. 84, = (*P. intermedia*, Feld.), p. 64 ; Nicév., Butt. Ind. ii.

Pseudergolis wedah, Koll., ♂ figured, pl. xxiii, fig. 109 ; Nicév., Butt. Ind. ii.

Yoma (Doherty, MS.) n. g. described, but treated as synonym of *Rhinopalpa* ; Nicév., Butt. Ind. ii, p. 245. *R. fulva*, Feld., ♂ figured, pl. xxiii, fig. 102 ; *id. t. c.*

Yoma, n. g., p. 258, near *Hypolimnas*, for *Y. vasuki*, Arakan, n. sp., p. 259 ; Doh., J. A. S. B. lv.

Rhinopalpa vasuki (Doherty, MS.), Burmah, n. sp., Nicév., Butt. Ind. ii, p. 247.

Kallima, all the E. Indian described species of the *K. inachis* group considered to be one species, p. 259 ; also *K. horsfieldii*, Koll., *philarchus*, Westd., *alompra*, Moore, *doubledayi*, Moore, *mackwoodi*, Moore, considered to be one species, p. 264 ; *K. wardi*, Moore, ♀ figured, pl. xxiii, fig. 104 ; Nicév., Butt. Ind. ii. *K. buxtoni* var., pl. xxxvii, fig. 2, figured ; Dist., Rhop. Mal.

Kallima knyretti, Bhutan, n. sp., Nicév., Butt. Ind. ii, p. 267.

Doleschallia polibete, Cr., ♂ figured, pl. xxiii, fig. 103 ; Nicév., Butt. Ind. ii.

D. amboinensis, pl. xxxix, *melana*, Amboyna, p. 104, Stdgr., Exot. Schmett., n. spp.

Eurytela castlenau, ♀ figured, pl. xliii, fig. 10 ; Dist., Rhop. Mal. *E. horsfieldi*, Bois., ♂ figured, pl. xviii, fig. 69 ; Nicév., Butt. Ind. ii.

Anartia amalthea, metamorphoses ; Müller, Zool. JB. i, p. 447. *A. amalthea*, L., *jatrophæ*, L., var. *saturata*, Stgr., figured, pl. xxxix ; Stdgr., Exot. Schmett. *A. jatrophæ*, L., n. var. *jamaicensis* ; Mösch., Abh. senck. Ges. xiv, p. 27, sep. pag.

Taxonomy of *Ergolis*, *Eurytela*, and *Byblia* ; Nicév., Butt. Ind. ii, p. 7. *Ergolis*, male secondary sexual character ; *id. t. c.* p. 8. *E. actisanes*, How., ♀, description and figure of ; Holl., Tr. Am. Ent. Soc. xiii, p. 327, pl. ix, fig. 3. *E. isæus* figured, pl. xxxix, fig. 6 ; Dist., Rhop. Mal. *E. merione*, Cr., ab. = (*E. tapestrina*, Moore) ; Nicév., *t. c.* p. 9 : ♂ figured, pl. xviii, fig. 70 : *E. adriane*, L., = (*E. indica* and *minorata*, Moore), p. 10, larva described, p. 11, *id.*

Byblia ilithyia, Drury, = (*Hypanis polinice*, Cr.), p. 14, ♂ figured, pl. xviii, fig. 68, transformations, p. 15 ; Nicév., Butt. Ind. ii.

Hypanis castanea, Somali, Butl., P. Z. S. 1885, p. 759 (? = *H. unvatura*, Lefb., nec Boisd.), n. sp.

Cybdelis peruviana, provisional name proposed for a species in case it should prove not to be (though he supposes it is) *boliviana*, Salv., p. 107; Stdgr., Exot. Schmett.

Crenis amulia, Cr., ♀, description and figure of; Holl., Tr. Am. Ent. Soc. xiii, p. 328, pl. ix, fig. 1. *C. occidentarium*, Mab., = (*rabbei*, Dewitz); Mab., Bull. Soc. Ent. Fr. (6) vi, p. cxvii.

C. howensis, n. sp.?, Madagascar and Natal, *wallengreni*, Natal, pl. xl (as *boisduvali*), Stdgr., Exot. Schmett. p. 108, n. spp.

Eunica margarita, God., metamorphoses; Müller, Zool. JB. i, p. 467.

E. emmelina, Colombia, p. 109, *vetula*, Teffé, *violetta*, Pebas, pl. xl, p. 110, Stdgr., Exot. Schmett., n. spp.

Epiphile oreia, Hb., metamorphoses; Müller, Zool. JB. i, p. 471.

E. electra, Venezuela, Stdgr., Exot. Schmett. p. 111, pl. xli, n. sp.

Myscelia orsis, Dr., metamorphoses; Müller, Zool. JB. i, p. 461.

Orophila, n. g. (Schatz., but not characterised) for a portion of *Myscelia*; Doubl.; Stdgr., Exot. Schmett. p. 112.

Catonephle acontius, L., p. 463, *penthia*, Cr., p. 465, metamorphoses; Müller, Zool. JB. i. *C. penthiana*, provisional name for an insect from Chiriqui, which is probably not a species, and which perhaps has been already named by Godm. & Salv.; Stdgr., Exot. Schmett. p. 114.

Temenis agatha, Fab., metamorphoses; Müller, Zool. JB. i, p. 469, pl. xiv, fig. 4, & xv, fig. 14.

Nica canthara, Doubl., Chiriqui and S. America, described; Stgr., Exot. Schmett., p. 115.

Dynamine mylitta, Cr., p. 475, pl. xv, fig. 20, *tithia*, Hb., p. 477, metamorphoses; Müller, Zool. JB. i, p. 477.

D. pytheus, Venezuela, n. sp. (but in note stated to be *niveata*, Butl.), p. 115, *pebana*, n. sp., Pebas, p. 116; Stgr., Exot. Schmett. pl. xlii.

Callicore meridionalis, Bates, metamorphoses; Müller, Zool. JB. i, p. 473.

Catagramma pygas, God., metamorphoses; Müller, Zool. JB. i, p. 474. *C. excelsior*, Hew., n. varr. *excelsissima*, pl. xlii, *pastazza*, p. 121, and *nules* var. *militaris*, p. 122; Stgr., Exot. Schmett.

C. mena, Chanchamayo, Stgr., Exot. Schmett., p. 120, n. sp.

Hamatera pyramus, Fab., metamorphoses; Müller, Zool. JB. i, p. 474.

Callithea markii, Hew., this name to be suppressed, Hew. having mixed two species: these described as *C. hewitsoni*, Upper Amazons, pl. xliii, *wallacei*, Rio Negro, p. 123, Stgr., Exot. Schmett.; *C. salvini*, Iquitos, p. 124, *id. t. c.*: n. spp.

Gynaccia dirce, L., metamorphoses; Müller, Zool. JB. p. 450, pl. xv, fig. 19.

Ectima lirina, Feld., pupa described; Müller, Zool. JB. i, p. 461. *E. lrides*, Pebas, n. sp. ♀ (? *liria*, Fab., var.) ; Stgr., Exot. Schmett. p. 126, pl. xliii.

Ageronia (n. sp.), p. 453, pl. xv, fig. 9, *epinome*, Feld., p. 456, *fornax*, Hb., p. 456, *amphinome*, L., p. 458, *arete*, Doubl., p. 459, pl. xiv, fig. 1, metamorphoses. Müller, Zool. JB. i.

A. fallax, name proposed for the one of two species from S. Brazil, that shall prove to be not *epinome*, Feld. ; *A. ferox*, Colombia, *albicornis*, pl. xlv, Pebas, p. 127, *daphnis* (? *chloë*, Stoll, var.), Chanchamayo, p. 128, Stgr., Exot. Schmett. : n. spp.

Didonis biblis, Fab., metamorphoses ; Müller, Zool. JB. p. 478, pl. xv, fig. 7.

Vila cacica, Ecuador, Stgr., Exot. Schmett. p. 129, n. sp.

Cystineura apicalis, S. Brazil, n. sp. (or var. of *hypermnestra*, Hübn.) ; Stgr., Exot. Schmett. p. 130.

Pyrrhogyra lysanias, Feld., var. *maculata*, South Peru, p. 132 ; *catharina*, S. Brazil, *juani*, Colombia, p. 131, *nasica*, Colombia, p. 132, n. spp. ; Stgr., Exot. Schmett.

Chersonesia, Dist., treated as section of *Cyrestis*, Boisd. ; Nicév., Butt. Ind. ii, p. 249. *C. peraka* figured, pl. xl, fig. 6 ; Dist., Rhop. Mal.

Cyrestis thyodamas, Boisd., = (*Amathusia ganescha*, Koll.), p. 251 ; *C. cocles*, Fab., = (*formosa*, Feld., and *horatius*, W.-M. & Nicév., also *earli*, Dist.), pp. 254 & 255 ; the ♂ figured, pl. xxiii, fig. 107 ; Nicév., Butt. Ind. ii. *C. tabula*, Nicév., ♀ described ; Doh., J. A. S. B. lv, p. 258. *C. cocles*, fig. 13, *periander*, fig. 10, figured, pl. xli ; Dist., Rhop. Mal. *C. ganescha* and *thyodamas*, noticed ; Butl., P. Z. S. 1886, p. 363. *C. thyodamas*, Boisd., var. *andamanensis*, Stgr., pl. xlv, p. 132, *mænalis*, Er., var. *sumatrensis*, p. 133 ; Stgr., Exot. Schmett.

C. kuhni, Celebes, Röber, CB. Iris, p. 48, pl. ii, fig. 2 ; *C. wernickei*, Perak, Stgr., Exot. Schmett. p. 133 : n. spp.

Megalura chironides, Cuba, Stgr., Exot. Schmett. p. 134, n. sp.

Stibochiona nicea, Gray, ♂ figured, pl. xix, fig. 81 ; Nicév., Butt. Ind. ii.

Victorina trayja, Hb., metamorphoses ; Müller, Zool. JB. i, p. 446, pl. xv, fig. 5..

Hypolimnas bolina, = (*charybdis*, Butl.), Nicév., Butt. Ind. ii, p. 125 : larva noticed ; Müller, Zool. JB. i, p. 449. *H. misippus*, L., ♂ ♀ figured, pl. xx, fig. 85 ; Nicév., Butt. Ind. ii. *H. anomala*, figured, pl. xli, figs. 1, 2, 3, & 4 ; Dist., Rhop. Mal.

Hestina nama, ♂ figured, pl. xliii, fig. 9 ; Dist., Rhop. Mal. : ♀ figured, pl. xii, fig. 99 ; Nicév., Butt. Ind. ii.

Herona andamana, Moore, ♀, figured, pl. xviii, fig. 76 ; Nicév., Butt. Ind. ii. *H. marathus*, Doubl., var. *seneca*, Andaman Is. ; Stgr., Exot. Schmett. p. 138.

Euripus halitherses, var. ♀, figured ; Dist., Rhop. Mal. pl. xliii, fig. 11 : figured, pl. xx, fig. 90, varieties and ♀ forms described, pp. 19 & 20, var. = (*E. euplaeoides*, Feld.), p. 20 ; Nicév., Butt. Ind. ii.

E. holofernes, Celebes, Stgr., Exot. Schmett. p. 139, n. sp.

Penthema binghami, W.-M., ♂ figured, frontisp. fig. 121 ; Nicév., Butt. Ind. ii.

Parthenos cyaneus, Moore, ♂ figured, pl. xxi, fig. 95 ; Nicév., Butt. Ind. ii. *P. sylvia*, Cr., var. *brunnea*, Amboina ; *P. salentia*, Hopf., is also var. of *sylvia*, Cr. ; *P. tigrina*, Voll., var. *immaculata*, N. Guinea ; Stgr., Exot. Schmett. p. 141.

Adelpha isis, Dr., metamorphoses and habits ; Müller, Zool. JB. i, pp.

481-487, pls. xiv, fig. 5, & xv, fig. 8. *A. basiloides*, Bates., var. *lativittata*, Venezuela, p. 142, *mesentina*, Cr., var. *chancha*, Chancamayo, p. 144.

A. lesbia, Upper Amazons, p. 142, *inachia*, *eponina*, Columbia, p. 143, Stgr., Exot. Schmett., n. spp.

Lebadea ismene, Doub., ♂ figured, pl. xix, fig. 79; Nicév., Butt. Ind. ii. *L. alankara*, Horsf., var. *sumatrensis*; Stgr., Exot. Schmett. p. 142.

Cupha erymanthis figured, pl. xxiii, fig. 105; Nicev., Butt. Ind. ii.

Modusa, Moore, considered section of *Limenitis*; Nicev., Butt. Ind. ii, p. 156.

Limenitis sybilla, vars. noticed; Bull. Soc. Ent. Fr. (6) v, p. cc: larva and pupa; Buckler, Larv. Brit. p. 36, pl. vii, fig. 1. *L. dudu*, Westd., pl. xxiv, fig. 112 ♂, *trivena*, Moore, fig. 113, ♂ figured; Nicév., Butt. Ind. ii.

L. mimica, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) v, p. cc.; *L. cioccolatina*, Mou-Pin, *id. t. c.* p. ccvii: n. spp.

Neptis. *Rukinda*, Moore, treated as section of *Neptis*; Nicév., Butt. Ind. ii, p. 76: suggestions as to synonymy and seasonal forms of several species of *Neptis*, pp. 78-107: *id. t. c.* *N. soma*, Moore, figured, pl. xxii, fig. 108; *id. t. c.* *N. miah* var., pl. xli, fig. 14, *vikasa* var. *harita*, pl. xliii, fig. 8, *anjana* var., pl. xxxvi, fig. 11, figured; Dist., Rhop. Mal. *N. consimilis*, Boisd., var. *continua*, Jobi; Stgr., Exot. Schmett. p. 146.

Neptis yerburii, India, Butl., P. Z. S. 1886, p. 360; *N. cineracea*, Burmah, Smith, Ann. N. H. (5) xviii, p. 151; *N. kuhasa*, Cachar., p. 250, pl. xi, fig. 12, *burmana*, Tenasserim, p. 251, pl. xi, fig. 9, Nicév., J. A. S. B. lv; *N. kuhasa*, Cachar, p. 84, *burmana*, Burmah, p. 89, Nicév., Butt. Ind. ii; *N. thamala*, Mergui and Borneo, Moore, J. L. S. xxi, p. 36, pl. iii, fig. 1; *N. aurelia*, Malacca, p. 145, Stgr., Exot. Schmett.: n. spp.

Athyma perius, L., ♀ figured, pl. xx, fig. 89; Nicév., Butt. Ind. ii. *A. casa*, Moore, larva noticed; Müller, Zool. JB. i, p. 481.

A. rufula = (*A. reta*, W.-M., & Nicév., nec Moore), Andaman Is., p. 181, Nicév., Butt. Ind. ii., n. sp.

Abrota mirus, Fab., ♀, pl. xxiv, fig. 110, *jumna* ♂, Moore, also fig. 110 (both on plate being called *A. mirus*), figured; Nicév., Butt. Ind. ii.

Euryphene oxione, Hew., ♀ figured; Dew., B. E. Z. xxx, pl. vii, figs. 1 & 2.

E. goodii, W. Africa, Holl., Tr. Am. Ent. Soc. xiii, p. 329, pl. viii, fig. 1, n. sp.

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Neurosigma siva, Westd., ♂ figured, pl. xix, fig. 80; Nicév., Butt. Ind. ii.

Hamanumida daedalus and *meleagris* noticed; Butl., P. Z. S. 1885, p. 760. *H. daedalus*, Fab., var. *meleagrina*; Stgr., Exot. Schmett. p. 150.

Cymothoe ehmekei, figs. 3 & 4, *haynæ*, figs. 5 & 6, Centr. Africa, Dew., B. E. Z. xxx, p. 302, pl. vii, n. spp.

Dophla, Moore, treated as section of *Euthalia*; Nicév., Butt. Ind. ii, p. 193.

Euthalia: Dist., Rhop. Mal., figures *E. dunya*, pl. xxxviii, fig. 1, *bel-*

lata, pl. xxxvii, fig. 4, pl. xliii, fig. 12, *parta*, pl. xxxvii, fig. 7, *merta*, pl. xliii, figs. 1 & 2, *zichri*, fig. 6, *bipunctata*, fig. 3, *xiphiones*, pl. xxxvi, figs. 9 & 10, *lepidea* var., pl. xxxvi, figs. 4 & 5. *E. lepidea*, Butl., ♂ figured, pl. xix, fig. 78; Nicév., Butt. Ind. ii. *E. xiphiones*, Butl., = (*parrata*, Moore), p. 209; Nicév., t. c. *E. andersonii*, Moore, figured; Moore, J. L. S. xxi, pl. iii, figs. 3 & 4.

E. goodrichi, Perak, Dist., Ent. xix, p. 11; *E. plateni* (*action*, Hew., var. ?), Batchian, *duda*, Darjeeling, pl. liii, p. 152, Stgr., Exot. Schmett. : n. spp.

Tanaëcia cibaritis, Hew., ♂ figured, pl. xix, fig. 77; Nicév., Butt. Ind. ii. *T. nicévillei* figured; Dist., Rhop. Mal. pl. xl, fig. 9.

T. consanguinea, Malay Penins., Dist., Ent. xix, p. 11, and figured, Rhop. Mal. pl. xliii, fig. 4, n. sp.

Symphædra cyanipardus, Butl., ♂ & ♀ figured, pl. xxi, fig. 96; Nicév., Butt. Ind. ii. *S. pardalis* figured, pl. xl, fig. 7; Dist., Rhop. Mal.

S. recta, p. 188, *gupta*, p. 189, Upper Tenasserim, Nicév., Butt. Ind. ii; *S. tyrtæus*, Celebes, *pardalina*, Malacca, pl. liv (as *pardalis*), Stgr., Exot. Schmett. p. 154, n. spp.

Adolias thibetana, p. ccxv, *armandiana*, p. ccxvi, Mou-Pin, Pouj., Bull. Soc. Ent. Fr. (6) v, n. spp.

Rohana, Moore, noticed and deposited as syn. of *Apatura*; Nicév., Butt. Ind. ii, p. 53.

Apatura iris, larva and pupa; Buckler, Larv. Brit. p. 42, pl. vii, fig. 2: var. *bieli*, Oberth., figured, pl. iii, fig. 13; Oberth., Études d'Ent. xi. *A. namouna*, Doub., ♂ figured, pl. xx, fig. 91; *A. parysatis*, Westd., ♂ & ♀, fig. 92; Nicév., Butt. Ind. ii. *A. clyton*, Bois., habits noticed; Murtfeldt, Ent. Am. ii, p. 180. *A. laure*, Dr., p. 506, pls. xiv, fig. 9, & xv, fig. 21, metamorphoses; Müller, Zool. JB. i. *A. selina*, Bates, var. *lauretta*, S. Brazil, p. 158; Stgr., Exot. Schmett.

A. kallin, S. Brazil, p. 157, Stgr., Exot. Schmett.; *A. subalba*, Mou-Pin, Pouj., Bull. Soc. Ent. Fr. (6) v, p. cevii: n. spp.

Apaturina ribbei, Batchian, Röber, CB. Iris, p. 47, pl. ii, fig. 5, n. sp.

A. ribbei, Röber, is var. of *erminea*, Cr.: Stgr., Exot. Schmett. p. 159.

Megistanis japedus, Upp. Amazons and Peru, Stgr., Exot. Schmett. p. 174, pl. lx, n. sp.

Helcyra hemina, Hew., ♂ figured, pl. xix, fig. 83; Nicév., Butt. Ind. ii.

Sephisa dichroa, Koll., ♂ figured, pl. xx, fig. 93; Nicév., Butt. Ind. ii.

Dilipa morgiana, Westd., ♂ figured, pl. xx, fig. 86; Nicév., Butt. Ind. ii.

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Smyrna blomfieldii, Fab., larva noticed ; Müller, Zool. JB. i, p. 453.

Eulepis and *Haridra*, Moore, treated as sections of *Charaxes* by Nicév., Butt. Ind. ii, p. 271.

Charaxes polyxena, synonymy ; *C. affinis*, Butl., ♀, = (*wallacei*, Butl.) ; *latona*, Butl., = (*cimon*, Feld., and *brennus*, Feld.) ; Honr., B. E. Z. xxx, p. 131. *C. durnfordi*, pl. xl, fig. 8, *borneensis*, pl. xxxvii, fig. 6, *baya*, pl. xxxvi, fig. 1, *distanti*, fig. 2, figured ; Dist., Rhop. Mal. *C. dolon*, Westd., ♂ figured, pl. xxii, fig. 100 ; Nicév., Butt. Ind. ii. *C. athamas*, Drury, vars., = (*bharata*, Feld., *samatha* and *hamasta*, Moore) ; Nicév., p. 275. *C. agrarius*, n. var. p. 276 ; *C. psaphon*, Westd., ♀, = (*serendiba*, Moore), p. 285 ; Nicév., t. c. *C. candiope*, Godt., var. *thomasius*, p. 169 ; Stdgr., Exot. Schmett.

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Prothoe uniformis, Butl., figured, pl. xxxviii, fig. 4 ; Dist., Rhop. Mal. *P. angelica*, Butl., ♂ figured, frontisp., fig. 120 ; Nicév., Butt. Ind. ii.

Anæa, sp. near *Ates*, p. 498, pl. xv, fig. 18, *sthenos*, Prittw., p. 500, *phidile*, Hb., p. 501, pl. xv, fig. 17, metamorphoses ; Müller, Zool. JB. i.

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Nymphalis jasius, Fab., larva and pupa noticed ; Müller, Zool. JB. i, p. 505.

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MORPHIDÆ.

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Chinobas bore, Schn., and *taygete*, Hüb., are two species in America; Edw., Canad. Ent. xviii, p. 15.

Oeneis jutta, Hb., metamorphoses and occurrence of near Stockholm; Holmgren, Ent. Tidskr. 1886, p. 151.

Melanargia parce, with var. *lucida*, Central Asia, Staud., S. E. Z. xlvii, p. 236, n. sp.

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Pararge episcopalis, Thibet, Ch. Oberth., Bull. Soc. Ent. Fr. (6) v, p. ccxxvii, and figured, Études d'Ent. xi, pl. iv, fig. 24; *P. gracilis*, pl. iv, fig. 19, *dumetorum*, pl. iv, fig. 20, p. 23, Thibet, Oberth., Études d'Ent. : n. spp.

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Epinephele: named varr. of this genus described from Central Asia; Staud., S. E. Z. xlvii, pp. 247-251. *E. hyperanthes*, variety described; Ent. xix, p. 176.

E. habèrhaueri (n. sp.?), with var. *maureri*, p. 247, *E. hilaris*, p. 249, Central Asia, Staud., S. E. Z. xlvii; n. spp.

Hipparchia semele, larva and pupa; Buckler, Larv. Brit. p. 28, pl. iv, fig. 3: *janira* (Hellins), *t. c.* p. 166, pl. v, fig. 1; *tithonus* (Hellins), p. 167, pl. v, fig. 2; *hyperanthus* (Hellins), p. 170, pl. v, fig. 3, *t. c.*

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Mycæsis (Virapa) manii, Nicobar Islands, Doh., J. A. S. B. lv, p. 257, n. sp.

Calyssime carpenteri, Burma, Butl., Ann. N. H. (5) xviii, p. 183, n. sp.

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Y. alkibie, p. 422, *dædalea*, *complexiva*, pl. xl, fig. 2, p. 423, E. India, Swinh., P. Z. S. 1886; *Y. catharina*, Burma, Butl., Ann. N. H. (5) xviii, p. 183 : n. spp.

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Cænonympha ædipus, metamorphoses; Bull. Soc. Ent. Fr. (6) vi, p. clvii. *C. galactinus*, Boisd., description of the preparatory stages of; Edw., Canad. Ent. xviii, pp. 201–204.

C. cæca, Central Asia, Staud., S. E. Z. xlvii, p. 251, n. sp.

Argyronympha, n. g. (related to *Hypocysta* and *Nissanga*), p. 346, for *A. ugiensis*, pl. xxxiv, fig. 3, *pulchra*, fig. 4, Solómon Islands, n. spp., Mathew, P. Z. S. 1886, p. 347.

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Aulocera swaha, larva and pupa noticed; Young, Ent. M. M. xvii, p. 103. *A. saraswati* and *swaha* noticed; Butl., P. Z. S. 1886, p. 357. *A. padma*, Koll., and *scylla*, Butl., notes on; Doh., J. A. S. B. lv, p. 118.

Aulocera loha, Himalaya, Doh., J. A. S. B. lv, p. 118, n. sp.

Dyctis andersonii, Mergui, Moore, J. L. S. xxi, p. 33, pl. iii, fig. 5, n. sp.

ELYMNIDÆ.

Elymnias obnubila, Marsh., figured; Moore, J. L. S. xxi, pl. iii, fig. 2. *E. abrisa*, Dist., 1886, pl. xliii, fig. 5, *kunstleri*, Honr., pl. xli, fig. 9, *godferyi*, Dist., pl. xxxix, fig. 5, figured; Dist. Rhop. Mal.

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Libythea myrrha, pl. xlii, fig. 2, figured; Dist., Rhop. Mal. *L. lepita* and *myrrha* noticed; Butl., P. Z. S. 1886, p. 363. *L. rohini*, Marshl., ♀ figured, pl. xxiv, fig. 114; Nicév., Butt. Ind. ii.

Nemeobius lucina, larva and pupa, p. 85, pl. xii, fig. 3; Buckler, Larv. Brit.

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Dodona and *Taxila*, really synonymous; Butl., P. Z. S. 1886, p. 364.

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Taxila eugenes and *dipœa*, noticed; Butl., P. Z. S. 1886, p. 364.

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Cyrenia, characters of; Godm. & Salv., Biol. Centr. Am. Lep. Rhop. i, p. 400. *O. pyrippe*, figured, pl. xli, figs. 13 & 14; *id. t. c.*

Ithomeis, characters given; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 401. *I. imitatatrix*, figured and described; *id. t. c.*, pl. xli, figs. 15, 16, & 17, p. 402.

Tmetoglène, should include *Metapheles*, Bates, characters of the genus, *T. dinora*, figured and described, pl. xlii, fig. 1, p. 403, *esthema*, Feld., noticed, p. 404; Godm. & Salv., Biol. Centr. Am. Rhop. i.

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Lepricornis bicolor, Panama, pl. xliii, fig. 13, p. 405, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. sp.

Chamelimnas, Feld., characters of given, *C. villagomes*, figured, pl. xli, fig. 8, p. 406; Godm. & Salv., Biol. Centr. Am. Rhop. i.

Chimastrum, n. g. (after *Chamelimnas*), p. 407, for *Mesene argentea*, Bates, figured, pl. xlii, fig. 28, and for *Esthemopsis carnutes*, Hew.; Godm. & Salv., Biol. Centr. Am. Rhop. i.

Limnas, characters for given; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 408. *L. cœruleata*, referred with doubt to *Esthemopsis*, and figured; *id. t. c.* p. 413, pl. xli, figs. 6 & 7.

Esthemopsis, characters of given; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 411.

E. radiata, Costa Rica, pl. xlii, fig. 5, p. 486, and *unicolor*, Guatemala, pl. xlvii, fig. 6, p. 487, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp. (doubtful position).

Mesenopsis, n. g., p. 414, for *Limnas bryaxis*, Hew., and *melanochlora*, Godm. & Salv., the latter figured, pl. xli, fig. 5; Godm. & Salv., Biol. Centr. Am. Rhop. i.

M. briseis, Colombia; Godm. & Salv., Biol. Centr. Am. p. 414, n. sp.

Symmachia, characters given; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 415. *S. rubina*, figured, pl. xlii, fig. 12, = (*Emesis irata*, Butl.); *id. t. c.* p. 419. [See also *Oaria* infra.]

S. yucatanensis, Mexico, p. 416, *championi*, Guatemala, *belti*, Nicaragua and Colombia, p. 417, *harmodius*, Colombia, p. 418, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp.

Cricosoma, Feld., characters of; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 419.

Mesene, characters of, p. 421, species figured, *ignicauda*, Godm. & Salv., figs. 19, 20, & 21, *rubella*, Bates, figs. 22, 23, & 24, *silaris*, Godm. & Salv., fig. 29, pl. xlii; Godm. & Salv., Biol. Centr. Am. Rhop. i. *M. monogramma*, Bates, = (*Beotia quadrinotata*, Butl., and *B. barzunes*, Hew.); *id. t. c.* p. 424. *M. hedemanni*, Feld. = (*niciaides*, Bois.; *id. loc. cit.* *M.*

macularia, referred to *Charis*; *iid. t. c.* p. 432. *M. simbla*, Bois., cf. *Bæotis zonata*.

M. phœnicura, Nicaragua and Colombia, p. 421, *leucopus*, Guatemala, p. 423, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp.

Pachythone gigas, figured; Godm. & Salv., Biol. Centr. Am. Rhop. i, pl. xliv, fig. 25.

Purnes, West., characters of; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 426.

Charis, Hub., characters of, Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 427: species figured, *C. cadmeis*, figs. 1 & 2, *velutina*, figs. 3 & 4, *argyrodes*, figs. 5 & 6, *holosticta*, fig. 7, *pæcilopectera*, figs. 23 & 24, pl. xlv, *crocea*, pl. xlvii, figs. 3, 4, & 5. *C.* (sub *Mesene*) *macularia*, Bois., = (*C. ochreus*, Godm. & Salv.); *iid. t. c.*, p. 432.

C. laverna, Mexico to Panama, (= *C. cænius*, Godm. & Salv. *nec* L.), p. 430, *occidentalis*, Colombia, p. 431; Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp.

Calydna, characters of, p. 433; *C. venusta*, Mexico, Nicaragua, pl. xlvii, figs. 1 & 2, p. 433, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. sp.

Sarota (*Helicopsis*, Sect. 2), West., given generic importance, with characters, pp. 434 & 435; Godm. & Salv., Biol. Centr. Am. Rhop. i.

S. gamelia, Guatemala to Panama, p. 436, *myrtea*, Guatemala, Nicaragua, *psaros*, Guatemala (the latter figured, pl. xliii, figs. 14 & 15, as *Anteros psaros*), p. 437; Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp.

Anteros, Hub., limited and defined; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 437. *A. renaldus*, Stoll., figured, pl. xlii, figs. 6 & 7; *A. formosus*, Cr., = (*micon*, Druce), p. 438; *A. carausius*, Westd., = (*medusa*, Druce), p. 440; *iid. t. c.*

A. roratus, Guatemala to Panama, Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 439, n. sp.

Emesis, Ill., characters of given, p. 441; species figured, *E. athalia*, pl. xlii, figs. 16 & 17, = (*oliveæ*, Butl. & Druce), p. 442, *tenedia*, pl. xliii, figs. 16, 17, & 18. *E. mandana*, Cr., = (*furor*, Butl. & Druce), p. 443. *E. zela*, Butl., = (*Lemonias ares*, Edw.), p. 444. *Lemonias cleis*, Edw., referred to *Emesis*, p. 445; Godm. & Salv., Biol. Centr. Am. Rhop. i.

E. vulpina, Mexico, *lupina*, Honduras to Costa Rica, pl. xlii, figs. 13, 14, & 15, *tegula*, Mexico to Panama, p. 444, *saturata*, *liodes*, pl. xliii, figs. 19, 20, & 21, Mexico, p. 447, Godm. & Salv., Biol. Centr. Am. Rhop. i; *E. princeps*, Thibet, Oberth., Études d'Ent. xi, p. 22, pl. vii, fig. 57: n. spp.

Caria, Hub., applied to a section of *Symmachia*, and characters given, p. 447; *C. rhacotis*, Godm. & Salv., figured, pl. xlii, figs. 10 & 11; Godm. & Salv., Biol. Centr. Am. Rhop. i.

C. lampeto = (*amazonica*, Godm. & Salv. olim *nec* Bates), Guatemala to Panama, pl. xlii, figs. 8 & 9, p. 448. *ino*, Mexico, pl. xliii, figs. 22, 23, 24, & 25, *harmonia*, Panama, Colombia, pl. xliii, figs. 26 & 27, p. 449 (on plate these are called *Symmachia*), Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp.

Exoplisia, n. g. for *Amarynthis hypochalybe*, Feld., = (*Nelone praxitheæ*, Bois.); Godm. & Salv., Biol. Centr. Am. Rhop. i.

Perophtalma, Westd., given generic rank, with characters; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 451.

Baotis, Hub., characters given, p. 452; *B. zonata*, Feld., = (*Mesene simbla*, Bois., and *Charis libna*, Butl.), p. 453; Godm. & Salv., Biol. Centr. Am. Rhop. i. *B. barce*, Hew., referred to *Mesene*; *vid. t. c.*

Metacharis, characters given, p. 453; *M.* (sub *Charis*) *victrix*, Hew., figured, pl. xlv, figs. 9, 10, 11, & 12, sub nom. *nigrella*; Godm. & Salv., Biol. Centr. Am. Rhop. i.

Lasaia, Bates, characters of; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 454.

Tharops, characters given, p. 456; *T. isthmica*, figs. 13 & 14, and *T. purpurata*, figs. 15 & 16, figured, pl. xlv; *T. picta*, Guatemala to Colombia, p. 457, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. sp.

Lemonias limited and defined, pp. 457-459; species figured, *L. adelina*, pl. xlvii, figs. 9 & 10, *lilina*, pl. xlv, fig. 21, *densemaculata*, Hew., = (*debilis*, G. & S., olim.), pl. xlv, fig. 19, *theages*, pl. xlv, fig. 22, *pelarge*, pl. xlv, figs. 17 & 18, *zeurippa*, pl. xlv, figs. 4 & 5, *lasthenes*, pl. xlv, figs. 1, 2, & 3, *labotas*, pl. xlv, figs. 8 & 9; *L. pseudocrispus*, = (*nepia*, Westw. & Hew.), p. 462; *L. cleis* and *ares*, Edw., *cf. Emesis*; Godm. & Salv., Biol. Centr. Am. Rhop. i.

L. glauca, Costa Rica, pl. xlv, fig. 20, p. 460, *agave*, Panama, pl. xlvii, figs. 7 & 8, p. 462, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp.

Hamearis, Hub., treated as valid genus and defined, p. 464; *H. erostratus*, Doubl. & Hew., figs. 6 & 7, *domina*, Bates, figs. 10, 11, & 12, figured, pl. xlv; Godm. & Salv., Biol. Centr. Am. Rhop. i.

Apodemia, Feld., defined, p. 466; *A. hypoglaucia* figured, pl. xlv, figs. 13 & 14; *A.* (sub *Nemeobius*) *virgulti*, Behr., = (*A. sonorensis*, Feld.) p. 467; Godm. & Salv., Biol. Centr. Am. Rhop. i.

A. hepburnii, figs. 11 & 12, *walkeri*, figs. 13 & 14, pl. xlvii, Mexico, p. 468, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp.

Polystigma, n. g. for *Chrysophanus nais*, Edw.; Godm. & Salv., Biol. Centr. Am. Rhop. p. 469.

Nymphidium, Ill., defined, p. 470; species figured, *N. praeclarum*, Bates, pl. xlv, fig. 15, *doritis*, fig. 16, *haematostictum*, pl. xlv, figs. 1 & 2, *sicyon*, fig. 4, *ictericum*, fig. 3, *velabrum*, pl. xlv, figs. 19 & 20; Godm. & Salv., Biol. Centr. Am. Rhop. i.

N. labdacus, pl. xlvii, fig. 17, p. 471, *laius*, pl. xlvii, figs. 15 & 16, p. 472, Guatemala, *ipsea*, Nicaragua, pl. xlv, figs. 17 & 18, *nycteus*, Panama, pl. xlvii, fig. 18, p. 476, *germanus*, Colombia, p. 478, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp.

Pandemos, Hub., defined, p. 478; *P. nymphidioides*, Butl., figured, pl. xlv, figs. 5 & 6; Godm. & Salv., Biol. Centr. Am. Rhop. i.

Aricoris, Westw., characters given; Godm. & Salv., Biol. Centr. Am. Rhop. i, p. 479.

Theope, Westw., characters given, p. 480; species figured, *T. eudocia*, pl. xlv, figs. 10, 11, & 12, *hypoxanthe*, pl. xlvii, figs. 21 & 22, *isia*, pl. xlv, figs. 20 & 21, *barea*, pl. xlv, figs. 13, 14, & 15, *virgilius*, pl. xlv, figs. 7 & 8, *publius*, pl. xlvii, figs. 19 & 20, *basilea*, pl. xlv, figs. 22, 23, 24, & 25, *decorata*, pl. xlv, figs. 18 & 19; Godm. & Salv., Biol. Centr. Am. Rhop. i.

T. theutis, Guatemala, pl. xlv, figs. 16 & 17, *folia*, pl. xlvii, figs. 23 & 24, *herta*, pl. xlvii, figs. 25 & 26, p. 483, *cratylus*, pl. xlv, fig. 9, Panama, p. 484, Godm. & Salv., Biol. Centr. Am. Rhop. i, n. spp.

Isapis, Westw., characters given, p. 485; *I. hera*, Guatemala, p. 486, n. sp.; Godm. & Salv., Biol. Centr. Am. Rhop. i.

LYCENIDÆ.

Liptena libyssa; Hew., var. figured, pl. ii, fig. 4; Dewitz, Deutsche e. Z. xxx.

L. anneckeii, p. 427, pl. ii, fig. 2, *ideoidei*, fig. 9, *girthii*, fig. 7, p. 428, W. Africa, Dewitz, Deutsche e. Z. xxx, n. spp.

Pentila alba, pl. ii, fig. 8, *muhata*, fig. 6, p. 428, *hiendlmayri*, fig. 3, p. 429, W. Africa, Dewitz, Deutsche e. Z. xxx, n. spp.

Gerydus multistrigatus, Nicév., discussed and referred to *Allotinus*; Doh., J. A. S. B. lv, p. 131.

Megalopalpus, n. g. for *M. simplex*, Borneo, n. sp., pl. iv, fig. 4; Röber, CB. Iris, p. 51.

Allotinus multistrigatus, Himalaya, Nicév., J. A. S. B. lv, p. 253, pl. xi, figs. 11 & 2; *A. alkamah*, Malay Penins., Dist., Rhop. Mal. p. 452, pl. xlv, fig. 3; *A. obscurus*, Celebes, Röber, CB. Iris, p. 52, pl. iv, fig. 8 : n. spp.

Logania : Moore figures *substrigosa*, fig. 8, *marmorata*, fig. 7, *andersonii*, fig. 6, pl. iii; J. L. S. xxi.

L. sriwa, Malacca, Dist., Ann. N. H. (5) xvii, p. 531, and figured, pl. xlv, fig. 16, Rhop. Mal., n. sp.

Thamala miniata, Moore, ♀ described and figured; Moore, J. L. S. xxi, p. 42, pl. iv, fig. 1.

Biduanda fabricii, Moore, sexes figured, male described; Moore, J. L. S. xxi, p. 42, pl. iv, figs. 2 & 3.

Pathalia malaya, Horsf., tailed and tailless forms noticed; Doh., J. A. S. B. lv, p. 134.

Drupadia lisias, Fab., figured; Waterh., Aid, pl. 165, figs. 2 & 3. *D. moorei* var. figured, pl. xlv, fig. 11; Dist., Rhop. Mal.

Chiliaria kina and *othona*, Hew., sexes described; Doh., J. A. S. B. lv, pp. 128 & 129. *C. (sub Myrina) lisides*, Hew., ♀ described; Moore, J. L. S. xxi, p. 43.

Sinthusa amba figured; Dist., Rhop. Mal. pl. xlv, figs. 12 & 19.

S. amata, Malay Penins., p. 461, pl. xlv, fig. 20, n. sp., Dist., Rhop. Mal.

Satadra canaraica, Moore, figured; Waterh., Aid, pl. 165, fig. 5.

S. tusta, Sikkim, Nicév., J. A. S. B. lv, p. 25, pl. xi, fig. 3, n. sp.

Catochrysops cnejus, ♀ figured; Dist., Rhop. Mal. pl. xlv, fig. 15.

C. naidina, pl. xlvii, fig. 2, *fumosa*, *lois*, Somali, Butl., P. Z. S. 1885, p. 762, n. spp.

Lampides goodenovi, Butl., figured; Waterh., Aid, pl. 165, fig. 6. *L. alianus* var. = (*Plebius malaccanus*, Röb., 1886); Dist., Rhop. Mal. p. 456.

L. Abdul, Malacca, Dist., Rhop. Mal. p. 456, pl. xlv, fig. 22; *L. conferenda*, Burma, Butl., Ann. N. H. (5) xviii, p. 185; *L. pura*, *subdita*, Mergui, Moore, J. L. S. xxi, p. 41 : n. spp.

Nacaduba (sub *Lampides*) *viola*, Moore, = (*Lycænesthes merguiana*, Moore) ; Moore, J. L. S. xxi, p. 40. *N. macrophthalma*, ♀, pl. xlv, fig. 8, *kerriana*, Dist., 1886, pl. xlii, fig. 12, figured ; Dist., Rhop. Mal.

N. kerriana, Singapore, Dist., Ann. N. H. (5) xvii, p. 253, n. sp.

Azanus uranus, India, Butl., P. Z. S. 1886, p. 366, pl. xxxv, fig. 1, n. sp.

Tarucus extricatus, India, Butl., P. Z. S. 1886, p. 366, pl. xxxv, fig. 2 ;

T. callinara, Burma, Butl., Ann. N. H. (5) xviii, p. 185 : n. spp.

Castalius manluena, Feld., ♂ described, Doh., J. A. S. B. lv, p. 261 ;

C. lactinatus, Somali, Butl., P. Z. S. 1885, p. 764, pl. xlvii, fig. 3 ; *C.*

approximatus, Burma, Butl., Ann. N. H. (5) xviii, p. 186 ; *C. airavati*,

Nicobar Is, Doh., J. A. S. B. lv, p. 261 : n. spp.

Cyaniris jynteana var., pl. xlv, fig. 6, *placida*, fig. 7, sp. ♀, fig. 10, figured ; Dist., Rhop. Mal. *C. marginata*, Nicév., ♀ described ; Doh., J. A. S. B. lv, p. 134.

Megisba thwaitesi figured ; Dist., Rhop. Mal. pl. xlv, fig. 4.

Zizera maha, Koll., and *chandala*, Moore, distinguished, p. 426 ; *sangra*, Moore, note on, p. 427 : Swinh., P. Z. S. 1886.

Zizera ? *usta*, Malacca, Dist., Ann. N. H. (5) xvii, p. 531, figured, Rhop. Mal. pl. xlv, fig. 5, n. sp.

Chrysophanus phleas, larva and pupa, p. 91, pl. xiii, fig. 4 ; Buckler, Larv. Brit. *C. salustius*, larva noticed ; Hudson, Ent. xix, p. 172.

C. cyprotus, New South Wales, Oll., P. Linn. Soc. N.S.W. x, p. 716 ;

C. li, Thibet, Ch. Oberth., Bull. Soc. Ent. Fr. (6) vi, p. xxii, figured,

Études d'Ent. xi, pl. v, figs. 34 & 38 ; *C. pang*, p. xii, figured, *id. t. c.*

fig. 35 ; *C. tseng*, p. xiii, figured, *t. c.* fig. 36, Thibet, C. Oberth., Bull. Soc. Ent. Fr. (6) vi : n. spp.

Polyommatus chryseis variety ; Bull. Soc. Ent. Fr. (6) vi, p. clxvi. *P. caspius* var. *transiens*, p. 201 ; *P. phænicurus* var. *iliensis*, p. 203, described : Staud., S. E. Z. xlvii.

P. sultan, *sarthus*, Central Asia, Staud., S. E. Z. xlvii, p. 202 ; *P. bagus*, Malay Penins., Dist., Ann. N. H. (5) xvii, p. 532 ; figured, Rhop. Mal. pl. xlv, fig. 13 : n. spp.

Polyommatus (*Lycæna*) *argiolus*, larva and pupa, pp. 94 & 188, pl. xiv, fig. 1, *alsus*, p. 100, pl. xiv, fig. 2, *arion*, p. 105 & 188, *corydon*, p. 191, pl. xiv, fig. 3, *adonis*, p. 106, pl. xv, fig. 1, *alexis*, pp. 111 & 191, pl. xv, fig. 2, *ægon*, p. 112, pl. xv, fig. 3, *agestis*, p. 116, pl. xvi, fig. 1, var. *artaxerxes*, p. 121, fig. 1 ; figured and described, Buckler, Larv. Brit.

Lycæna: numerous varieties from Central Asia, described with names by Staud., S. E. Z. xlvii, pp. 203-215 & 225. *L. argiolus*, habits, &c., Bath, Ent. xix, p. 29 ; Weir, *t. c.* p. 50 : *t. c.* pp. 61, &c., 88, 122, 154, & 155. *L. bellargus* and *icarus*, hybridisation, P. E. Soc. 1886, p. xxxi. *L. argiades*, Pall., description and figures ; Camb., P. Dors. N. H. vii, pp. 79-83, pl. v. *L. pseudargiolus* varr. *violacea*, *neglecta*, *lucida*, figured ; Maynard, Butt. New Engl. pl. vi. *L. corydon*, Scop., aberration described ; Vángel, Rov. Lapok, iii, p. xxiv. *L. ægon* and *argus*, characters of ; Rühl, Soc. Ent. i, pp. 90-92. *L. semiargus*, metamorphoses ; Le Nat. viii, p. 316. *L. escheri*, Hb., hermaphrodite ; Haase, CB. Iris, p. 38, pl. iia, figs. Cc, Cd, Ce.

L. lanty, pl. vii, fig. 53, *felicis*, pl. vii, fig. 52, p. 21, Thibet, Oberth.,

Études d'Ent. xi ; *L. argiva* (*argus* var. ?), p. 204, *eversmanni*, p. 205, *iris*, p. 207, *rutilans*, p. 208, *pretiosa*, p. 209, *venus*, p. 211, *phryxix*, p. 212, *charybdis*, p. 226, *iphicles*, p. 227, Central Asia, Staud., S. E. Z. xlvii ; *L. dominica*, Jamaica, Mösch., Abh. senck. Ges. xiv, p. 26, sep. pag., pl., fig. 10 : n. spp.

Fenesica tarquinius, Fab., on the history and preparatory stages of ; Edw., Canad. Ent. xviii, pp. 141-153 : notes on ; Riley, t. c. pp. 191-193, Haley, t. c. pp. 193 & 194 : carnivorous habits of larva ; Riley, Am. Nat. xx, p. 556 ; also Ent. Nachr. xii, p. 219.

Polycæna, n. g., p. 227, between *Polyommatus* and *Lycæna*, for *P. tamerlana*, Central Asia, n. sp., p. 229, with var. *timur*, p. 230 ; Staud., S. E. Z. xlvii.

Plebeius ribbei, New Guinea, p. 52, pl. iv, fig. 2, *illustris*, Key Is., p. 53, pl. iv, fig. 6, *schatzi*, Batchian, p. 53, pl. iv, fig. 1, *snelleni*, Celebes, pl. iv, fig. 9, with var. *batjanensis*, pl. iv, fig. 10, *lucianus*, Aru Is., pl. iv, fig. 11, p. 54, *callistus*, Philippines, pl. iv, fig. 13, *insularis*, Java, &c., pl. iv, fig. 14, p. 55, *optimus*, Malacca, &c., pl. iv, fig. 16, with var. *obscurus*, Celebes, *osias*, Philippines, pl. v, fig. 17, p. 56, *amphissa* (Feld.), Batchian, with var. *aruanus*, pl. iv, fig. 12, *malaccanus*, Perak and Philippines, pl. iv, fig. 3, p. 57 (cf. *Lampides ælianus*), *callinicus*, Ceram, pl. iv, fig. 15, *orestes*, pl. iv, fig. 20, *festivus*, pl. iv, fig. 17, Celebes, p. 58, *albo-cæruleus*, pl. iv, fig. 7, *leucofasciatus*, pl. iv, fig. 32, Hong Kong, p. 59, *kuhni*, Celebes, pl. iv, fig. 20, *luzonicus*, Philippines, pl. v, fig. 22, *griseus*, Celebes, pl. iv, fig. 18, p. 60, *tualensis*, Key Is., pl. v, fig. 26, *phönix*, Celebes, pl. iv, fig. 26, *lucifer*, pl. iv, fig. 5, *cabrorus*, pl. iv, fig. 25, Aru Is., p. 61, *dimorphus*, pl. iv, figs. 27 & 28, with varr. *cupreus* and *cæruleus*, New Guinea, p. 62, *staudingeri*, Ceram, pl. iv, figs. 22 & 23, *tombugensis*, pl. v, fig. 18, *azureus*, pl. iv, fig. 19, Celebes, p. 63, *illuensis*, pl. iv, figs. 30 & 31, *subfestivus*, pl. iv, fig. 33, Ceram, &c., p. 64, *albofasciatus*, pl. iv, fig. 21, *dobbensis*, pls. v, fig. 19, and iv, fig. 34, *meiranganus*, pl. v, figs. 23 & 25, p. 65, *fatueus*, pl. v, fig. 21, Aru Is., *unicolor*, pl. v, fig. 4, Ceram, p. 66, *seltuttus*, Aru Is., p. v, fig. 24, *gracilis*, Ceram, pl. v, fig. 1, p. 67, Röber, CB. Iris : n. spp.

Everes exiguus, Singapore, Dist., Rhop. Mal. p. 455, pl. xlv, fig. 17, n. sp.

Narathura buxtoni figured, pl. xlv, fig. 18 ; Dist., Rhop. Mal.

Horaga halba, Malay Penins., Dist., Rhop. Mal. p. 460, pl. xlv, fig. 23, n. sp.

Iraota nila, Malacca, p. 462, pl. xlv, fig. 24, Dist., Rhop. Mal., n. sp.

Catapæcilma (?) *bubases* figured ; Dist., Rhop. Mal. pl. xlv, fig. 26.

Thecla betulae, larva and pupa, p. 184, pl. xii, fig. 4, *pruni*, pl. xii, fig. 5, *v-album*, pl. xiii, fig. 1, *quercus*, p. 185, pl. xiii, fig. 2, *rubi*, p. 89, pl. xiii, fig. 3 ; figured and described, Buckler, Larv. Brit.

T. mandara, Himalaya, Doh., J. A. S. B. lv, p. 130 ; *T. bieti*, p. 19, pl. iv, fig. 22, *v-album*, pl. iv, fig. 23, *tsangkie*, pl. vii, figs. 55 & 56, p. 20, *desgodinsi*, pl. vii, fig. 54, p. 21, Thibet, Oberth., Études d'Ent. xi ; *T. seraphim*, Thibet, Ch. Oberth., Bull. Soc. Ent. Fr. (6) vi, p. xii, figured, Études d'Ent. xi, pl. v, fig. 37 ; *T. tirrhaea*, Jamaica, Mösch., Abh. senck. Ges. xiv, p. 26, sep. pag. : n. spp.

- Remelana yajna*, Himalaya, Doh., J. A. S. B. lv, p. 128, n. sp.
Aphæneus homeyeri, W. Africa, Dewitz, Deutsche e. Z. xxx, p. 429, pl. ii, fig. 5 ; *A. æstivus*, E. India, Swinh., P. Z. S. 1886, p. 428, pl. xl, fig. 1 : n. spp.
Spindasis somalina, Somali, Butl., P. Z. S. 1885, p. 764, pl. xlvii, fig. 5 ; *S. hypargyros*, India, pl. xxxv, fig. 3, *bellatrix*, Suakim, *id. op. cit.* 1886, p. 369 : n. spp.
Chloroselas, n. g. near *Spindasis*, for *C. esmeralda*, Somali, n. sp. ; Butl., P. Z. S. 1885, pl. xlvii, fig. 4.
Ilerda coruscans, Moore, and allies noticed ; Doh., J. A. S. B. lv, p. 130.
I. tamu, Koll., noticed ; Butl., P. Z. S. 1886, p. 368.
Hypolycaena umbrosa, Somali, Butl., P. Z. S. 1885, p. 766, pl. xlvii, fig. 6, n. sp.
Lycesthes bengalensis, pl. xlv, fig. 9, *tessellata*, pls. xlii, fig. 13, and xlv, fig. 21, figured ; Dist., Rhop. Mal.
L. æthiops, Penang, Dist., Ann. N. H. (5) xvii, p. 253, n. sp.
Iolaus glaucus, Somali, Butl., P. Z. S. 1885, p. 766, n. spp.
Poritia pharyge figured ; Dist., Rhop. Mal. pl. xli, fig. 8. *P. phraatica*, Hew., ♂ described ; Moore, J. L. S. xxi, p. 38.
Deramas, n. g. near *Poritia*, for *D. livens*, Singapore, n. sp., figured, Rhop. Mal. pl. xlii, fig. 15 ; Dist., Ann. N. H. (5) xvii, p. 252.
Sithon niasica, Nias I., Röber, CB. Iris, p. 68, pl. v, fig. 20, n. sp.
Deudorix epijarbas, pl. xli, fig. 5, *xenophon*, pl. xlv, figs. 1 & 2, figured ; Dist., Rhop. Mal.
D. caroli, New Guinea, Janson, Cruise of the Marchesa, ii, p. 375 ; *D. ribbei*, p. 68, pl. v, figs. 10 & 11, *affinis*, p. 69, figs. 8 & 13, Celebes, Röber, CB. Iris : n. spp.
Curetis insularis, pl. xli, figs. 6 & 7, *æsupus*, ♀, pl. xlv, fig. 14, figured ; Dist., Rhop. Mal.
C. ribbei, Aru Is., p. 70, pl. v, figs. 2 & 3, Röber, CB. Iris, n. sp.
Amblypodia andersonii, Moore, figured ; Moore, J. L. S. xxi, pl. iv, fig. 4.
A. ribbei, Aru Is., p. 70, pl. v, fig. 5, *bicolora*, p. 71, pl. 5, fig. 7, *quercoides*, pl. v, fig. 9, Celebes, *violacea*, E. India, pl. v, fig. 6, p. 72, Röber, CB. Iris, n. spp.
Nilasera apella, E. India, Swinh., P. Z. S. 1886, p. 429, pl. xl, fig. 4, n. sp.
Darasana newara, Moore, figured ; Waterh., Aid, pl. 165, fig. 4.
Neocheritra gama, Penang, Dist., Rhop. Mal. p. 462, fig. 128 in text, n. sp.

HESPERIIDÆ.

Dist., Rhop. Mal., notices, pp. 366-368, the classification of the family, and divides it into two groups, dependent on the shape of the hind-wings, *Ismenaria* and *Erionoturia*, and tabulates the Malayan genera.

Unkana, n. g., pp. 369 & 370, for *U. butara* (Moore, MS.), pl. xxxiv, fig. 11, Malay Penins., n. sp., p. 370, and *U. elia*, Hew., and *attina*, Hew., which are figured, pl. xxxiv, figs. 25 & 30 ; Dist., Rhop. Mal.

Lotvagus, n. g., pp. 369 & 371, type *Eudamus calathus*, Hew., figured,

pl. xxxiv, fig. 14, and *L. maculatus*, Malay Penins., n. sp., p. 372, pl. xxxv, fig. 1; Dist., Rhop. Mal.

Choaspes, Moore, characters given, and the following species referred to it and figured: *crawfurdi*, Dist., pl. xxxiv, fig. 26, *harisa*, Moore, fig. 22, *chuza*, Hew., fig. 27, *malayana*, Feld. (with doubt), pl. xxxv, fig. 2; Dist., Rhop. Mal.

Hasora badra, Moore, fig. 3, *vitta*, Butl., fig. 4, figured, pl. xxxv; Dist., Rhop. Mal.

Paduka, n. g., pp. 369 & 375, for *P. glandulosa*, Singapore, n. sp., p. 376, pl. xxxv, fig. 5; Dist., Rhop. Mal.

Pirdana, n. g. for *Hesperia hyela*, Hew., pp. 369 & 376; figured, pl. xxxv, fig. 6.

Zea, n. g., type *Pamphila mythea*, Hew., pp. 369 & 377; figured, pl. xxxv, fig. 7; Dist., Rhop. Mal.

Matapa aria figured, pl. xxxv, fig. 8; Dist., Rhop. Mal.

Pithauria murdava, Moore, figured, pl. xxxv, fig. 9; Dist., Rhop. Mal.

Baoris, Moore: Dist. figures *moolata*, Moore, pl. xxxiv, *narooa*, Moore, fig. 12, *chaya*, Moore, fig. 9, *mathias*, Fab., pl. xxxv, fig. 10, and *unicolor*, Malacca, n. sp., p. 381, pl. xxxv, fig. 11; Rhop. Mal.

B. ? insignis, Singapore, n. sp., Dist., Rhop. Mal. p. 391, pl. xxxv, fig. 22.

Telicota: Dist. figures *T. angias*, L., pl. xxxiv, fig. 23, *bambuse*, Moore, pl. xxxv, fig. 12, *goloides*, Moore, fig. 13, *mæsoides*, Butl., pl. xxxiv, fig. 24, *maro*, Fab., pl. xxxv, figs. 14 & 15, *nigrolimbata*, Snell, pl. xxxv, fig. 16; Rhop. Mal.

Satarupa affinis var. *cognata* described and figured, p. 385, pl. xxxv, fig. 17; Dist., Rhop. Mal.

Parnara mangala, *bada*, and *beavani* noticed; Butl., P. Z. S. 1886, p. 377.

Goniurus brevicauda, Chiriqui, p. 83, *dominicus*, hab. ?, p. 84, Plotz, S. E. Z. xlvii, n. spp.

Eudamus tellus, Buenos Ayres, Plötz, S. E. Z. xlvii, p. 84; *E. germanus*, pl. vi, fig. 48, *nepos*, pl. vi, fig. 49, p. 26, Thibet, Oberth., Études d'Ent. xi: n. spp.

Proteides lankæ, Ceylon, Plötz, S. E. Z. xlvii, p. 85, n. sp.

Casiapa, Kirb., characters of genus and tabulation of species; Plötz, S. E. Z. xlvii, pp. 85 & 86. *C. phanaeus*, Hew., figured, pl. xxxv, fig. 18; Dist., Rhop. Mal.

Isma, n. g., pp. 369 & 386, for *I. obscura*, Singapore, n. sp., p. 386, pl. xxxv, fig. 19, and *H. bononia*, Hew., fig. 20, *I. ? homclea*, Hew., fig. 23; Dist., Rhop. Mal.

Arteurotia meris, Columbia, Plötz, S. E. Z. xlvii, p. 87, n. sp.

Lychnuchus irvina, Celebes, Plötz, S. E. Z. xlvii, p. 88, n. sp.

Pamphila actæon, p. 135, pl. xvii, fig. 2, *linea*, pp. 139 & 195, pl. xvii, fig. 3, *sylvanus*, pp. 141 & 196, pl. xvii, fig. 4, *comina*, pp. 142 & 198; larvæ and pupæ, Buckler, Larv. Brit. *P. subhyalina*, Brem., n. var. p. 28, pl. vi, fig. 45; Oberth., Études d'Ent. xi.

P. avanti, Sikkim, Nicev., J. A. S. B. lv, p. 255, pl. xi, fig. 10; *P. bivitta*, Thibet, p. 28, pl. vi, fig. 46, Oberth., Études d'Ent. xi: n. spp.

Pyrgus antonia, Speyer, var. *gigantea*, p. 255, *P. orbifer*, Hub., var.

lugens, p. 256, described; Staud., S. E. Z. xlvii. *P. alveus-fritillum*, n. var. *funginus*, *serratule*, *cacolia*, *andromeda*, *centaurea*, *malva-taras*, and *intermedia*, n. var., variation, &c., discussed; Schilde, B. E. Z. xxx, pp. 39-62, pl. ii.

P. (Syrichthus) proteus (*proto*, Esp., var. ?), p. 253, *P. nobilis*, p. 255, Staud., S. E. Z. xlvii, n. spp.

Syrichthus bieti, Thibet, Oberth., Études d'Ent. xi, p. 26, pl. vi, fig. 50, n. sp.

Thymele alveolus, larva and pupa, p. 123, pl. xvi, fig. 2; Buckler, Larv. Brit.

Thanaos tages, larva and pupa, p. 126, pl. xvi, fig. 3; Buckler, Larv. Brit.

Steropes paniscus, pp. 129-194, pl. xvii, fig. 1, larva and pupa; figured and described, Buckler, Larv. Brit.

Carterocephalus abax, pl. v, fig. 27, *houangty*, pl. v, fig. 5, *niveo-maculatus*, pl. ii, fig. 8, *flavomaculatus*, pl. ii, fig. 9, Thibet, Oberth., Études d'Ent. xi, p. 27, n. spp.

Halpe gupta, Sikkim, Nicév., J. A. S. B. lv, p. 254, pl. xi, fig. 1, n. sp.

Thymelicus (Hesperia) stigma, Central Asia, Staud., S. E. Z. xlvii, p. 252, n. sp.

Hesperia phineus, Cr., note on; Plötz, S. E. Z. xlvii, p. 101.

H. sextilis, Aburi, *edlichi*, hab. ?, *zalma*, Panama, p. 89, *beda*, Blumenau, *camposa*, Brazil, *quispica*, Peru, *weiglei*, Aburi, p. 90, *parthenope*, Nias, *traviata*, Sumatra, *angulis*, Panama, *gila*, Arizona, p. 91, *ormenes*, Nias, *taprobanus*, Ceylon, *mamurra*, Brazil, p. 92, *cretura*, Celebes, *cinerita*, Brazil, *diana*, St. Paulo, *hilda*, Blumenau, p. 93, *uruba*, Brazil, *zygia*, *iva*, hab. ?, *angellus*, Chiriqui, p. 94, *aethra*, *mulla*, Surinam, *proxima*, W. Africa, *jolanda*, Java, *conta*, Minas Geraes, p. 95, *vaika*, India, *hagasifa*, Java, *cabella*, Porto Cabello, p. 96, *wambo*, Africa, *nondoa*, Manila, *ceramica*, Ceram, *subviridis*, St. Paulo, p. 97, *bauri*, Aburi, *monica*, Blumenau, *piso*, Panama, p. 98, *catilina*, Blumenau, *mardou*, Washington, p. 99, *subhyalina*, Corea, p. 99, *librita*, Panama, p. 100, *kuehni*, Nias, *hyboma*, Minas Geraes, *issla*, Key Is., p. 101, *niasica*, Nias, p. 102, *aruana*, Aru, *zatilla*, hab. ?, p. 103, Plötz, S. E. Z. xlvii, n. spp.

Tagiades dealbata, Malay Penins., n. sp., p. 388, pl. xxxv, fig. 21; *T. atticus*, var. *calligana*, pl. xxxiv, fig. 6, *gana*, fig. 2, *ravi*, fig. 1, *lavata*, fig. 5, and *trichoneura*, Feld., var., fig. 20, figured; Dist., Rhop. Mal. *T. trichoneura* and *celebica* noticed; Plötz, S. E. Z. xlvii, p. 114.

T. chacona, Panama, p. 112, *vincula*, Panama, p. 113, Plötz, S. E. Z. xlvii, n. sp.

Abaratha sura, Moore, pl. xxxiv, fig. 16, *pygela*, Hew., fig. 18, figured; Dist., Rhop. Mal.

A. saraya, Himalaya, Doh., J. A. S. B. lv, p. 138, n. sp.

Erionota thrax, L., figured, pl. xxxiv, fig. 17; Dist., Rhop. Mal.

Erionota (?) *lalita*, Himalaya, Doh., J. A. S. B. lv, p. 263 (with structural characters, p. 264), n. sp.

Gangara thyrsis, Fab., figured, pl. xxxiv, fig. 13; Dist., Rhop. Mal.

Hidari, n. g., type *Hesperia irava*, Moore, pp. 392 & 395; this species

figured, pl. xxxiv, fig. 15, also *H. sybiritæ*, Hew., pl. xxxv, fig. 24; *H. staudingeri*, Malacca, n. sp., p. 395, pl. xxxv, fig. 25; Dist., Rhop. Mal.

Plastingia (sub *Hesperia*) *tessellata*, Hew., ♀ = (*flavescens*, Feld.), ♂ = (*eulepis*, Feld.); Plötz, S. E. Z. xlvii, p. 105. *P. laromia*, Hew., ♀ described; *id. t. c.* p. 104. *P. callineura*, Feld., figured, pl. xxxv, fig. 26; *P. hieroglyphica*, Butl., figured, pl. xlv, fig. 25; Dist., Rhop. Mal.

Apaustus vopiscella, Minas Geraes, p. 105, *luteipalpis*, Ceylon, p. 106, *locus*, hab. ?, *matuta* (H.-S. i.l.), hab. ?; Plötz, S. E. Z. xlvii; *A. (?) discreta*, India, *id.* B. E. Z. xxix, p. 232: n. spp.

Telesto aremius, Fab., ♂ noticed; Plötz, B. E. Z. xxix, p. 109.

T. waga, Aburi, Plötz, S. E. Z. xlvii, p. 108, n. sp.

Isoteinon masuriensis, Moore, hab. ?, described (an. n. sp. ?); Plötz, S. E. Z. xlvii, p. 109.

Astictopterus, Feld., characters given and species tabulated; Plötz, S. E. Z. xlvii, pp. 109 & 110: *A. salsala*, Moore, pl. xxxiv, fig. 21, var. = (*stellifer*, Butl.), p. 401, *xanites*, Butl., pl. xxxiv, fig. 28, *sindu*, Feld., pl. xxxv, fig. 30, figured; Dist., Rhop. Mal.

Kerana, n. g., type *Astictopterus armatus*, Druce, p. 392; figured, pl. xxxv, fig. 31; also *gemmifer*, Butl., pl. xxxiv, fig. 29, *aurivittata*, Moore, var. *cameroni*, pl. xxxiv, fig. 19, *diocles*, pl. xxxiv, fig. 8; Dist., Rhop. Mal.

Cyclopides argenteostriatus, Natal, Plötz, S. E. Z. xlvii, p. 110, n. sp.

Udaspes folus, Cr., figured, pl. xxxiv, fig. 3; Dist., Rhop. Mal.

Plesioneura alysos, Moore, pl. xxxiv, fig. 7, *asmara*, Butl., pl. xxxv, fig. 28, *pinwilli*, Butl., fig. 29, and *P. ? anthea*, pl. xxxv, fig. 32, figured; Dist., Rhop. Mal.

P. flavipes, New Guinea, Janson, Voyage of the Marchesa, ii, p. 377, n. sp.

Hyarotis adrastus figured, pl. xxxiv, fig. 4; Dist., Rhop. Mal.

Coladenia dan, Fab., figured, pl. xxxv, fig. 27; Dist., Rhop. Mal.

Oxynetra zambesina, Westw., described and referred to *Sapaea*; Plotz, S. E. Z. xlvii, p. 111.

Leucochitonea pampina, Buenos Ayres, Plötz, S. E. Z. xlvii, p. 111, n. sp.

Antigonus brigidella, Niam-Niam, p. 111, *zorilla*, Panama, p. 112, Plötz, S. E. Z. xlvii, n. spp.

Ismene radiosa, Celebes, *salanga*, Aru, Malacca, Plötz, B. E. Z. xxix, p. 232; *imperialis*, Celebes, *tolo*, Celebes, *ribbei*, Ceram, *id.* S. E. Z. xlvii, p. 115: n. spp.

Pyrhopyga hephaestos, Müschl., var. described, p. 116; *iphimedia*, Brazil, *parima*, Surinam, n. spp.; Plötz, S. E. Z. xlvii, p. 117.

HETEROCERA.

[Cf. Behr (42), Butler (91), Jordan (334), Knatz (355), Minot (454), Sorhagen (676), Wallengren (719).]

Value of characters in classification of *Heterocera* discussed; Butl., Tr. E. Soc. 1886, pp. 132-134.—Gigantic larva from S. Africa figured; Ent. xix, pl. i.

SPHINGIDÆ.

[*Cf.* Austaut (20), Butler (92), Dusing (157), Fernald & Smith (192), Grote (260), Holland (297), Kirby (350), Müller (475), Oberthur (491), Poulton (560, 561).]

The N. American genera of, and their nomenclature, discussed ; Fernald & Smith (192).

Fernald's *Sphingidæ* of New England, note on ; Grote, *Canad. Ent. xviii*, pp. 121-123 & 206.

Sphingidæ larvæ, markings of ; P. E. Soc. 1886, p. xiii. Coloration of *Sphingidæ* larvæ ; Dusing (157).

Sphingidæ abundant near Brussels in 1885 ; C.R. ent. Belg. 1886, p. li.

Hemaris tenuis, Grote, early stages of ; Holland, *Canad. Ent. xviii*, p. 101.

Dilophonota ello, L., early stages of ; Holland, *Canad. Ent. xviii*, p. 103.

Cherocampa maculator, Boisd., noticed ; Kirby, P. Z. S. 1886, p. 269.

C. elpenor larva, attitude of, food-plants ; Poulton, Tr. E. Soc. 1886, pp. 154-156.

Deilephila nerii, L., p. 3, pl. i, fig. 7, *celerio*, L., p. 4, pl. i, figs. 8 & 9, larvæ, noticed and figured ; Mill., *Nat. Sicil. vi*. *D. nerii* in Gothland ; Lampa, *Ent. Tidskr.* 1886, p. 115.

Sphinx celerio and *nerii* not indigenous in Europe ; Mill., *Nat. Sicil. v*, p. 241. *S. ligustri* : relations of the colours of the larva to those of its food-plants ; Poulton, Tr. E. Soc. 1886, p. 153 : ♀ paired with *Attacus cecropia* ♂ ; Weniger, *Ent. xix*, p. 136. *S. vancouverensis*, Edw., and *rashiti*, Str., synonymy of ; Holland, *Canad. Ent. xviii*, p. 103. *S. convolvuli* females are barren in Westphalia ; Landois, JB. westf. Ver. 1885, p. 25.

Acherontia, odour-apparatus of ; Haase, Z. Ent. Bresl. (2) xi, pp. 5 & 6. *A. atropos*, distribution, &c., discussed ; Rühl, Soc. Ent. i, pp. 7, &c. : var. of larva ; JB. westf. Ver. 1885, p. 24 : var. of larva described ; Balding, *Ent. M. M. xxii*, p. 279 : notes on larva of ; Poulton, Tr. E. Soc. 1886, pp. 143-153 : stridulation of ; *Ent. xix*, p. 248 : sound made by larva ; Poulton, *Ent. xix*, p. 17 : note on the position of its organ of sound ; Bleuse, *Le Nat. viii*, p. 358 : reported in beehive ; *Ent. M. M. xxiii*, p. 162.

Smerinthus : note on newly-hatched larvæ, with woodcut of caudal horn ; Poulton, Tr. E. Soc. pp. 141, &c. *S. ocellatus* and *tilia*, notes on larvæ of ; *id. t. c.* pp. 137-141. *S. ocellatus*, larval variation ; *id.* (561). *S. populi*, variety noted ; *Ent. xix*, p. 126. *S. excrucatus*, food-plants of ; Beutenmüller, *Ent. Am. i*, p. 196. *S. myops*, larval var. ; Bunker, *Canad. Ent. xviii*, p. 207.

S. michaëlis, Mantchuria, Ch. Oberth., *Bull. Soc. Ent. Fr.* (6) vi, p. lvi, n. sp.

Ambulyx (sub *Philampelis*) *eos*, Burm., var. described and figured ; Kirby, P. Z. S. 1886, p. 269, pl. xxvii, fig. 1.

A. tithonus, Brazil, Kirby, P. Z. S. 1886, p. 270, pl. xxvii, fig. 2, n. sp.

Protoparce abadonna, Fab., figured ; Kirby, P. Z. S. 1886, pl. xxvii, fig. 3, p. 271.

Metagustes bieti, Thibet, Oberth., Études d'Ent. xi, p. 29, pl. i, fig. 2, n. sp.

Nepheles hespera, Fab., habits noticed; Swinh., P. Z. S. 1886, p. 435.

ÆGERIIDÆ and THYRIDIDÆ.

[Cf. Hulst (318), Meyrick (439).]

Melittia cucurbitæ, and a related species, notes on; Scudder, Psyche, iv, pp. 303 & 304.

Sesia isozona, *chrysophanes*, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 689, n. spp.

Platythyris floridana, Florida, Hulst, Ent. Am. ii, p. 182, n. sp.

URANIIDÆ and CASTNIIDÆ.

[Cf. Möschler (470), Pagenstecher (518, 519).]

Sematura: synonymy of the genus and its species discussed; Möschl., Abh. senck. Ges. xiv, p. 65, sep. pag.

Damias auratiaca, Ceram, Pagen., CB. Iris, p. 43, pl. iii, fig. 4; *D. anah*, Key Is., *sobah*, p. 113, *romawa*, p. 114, New Guinea, Pag., JB. nass. Ver. xxxix: n. spp.

AGARISTIDÆ.

[Cf. Butler (91, 95), Oberthur (491), Pagenstecher (518), Röber (613).]

Agarista pagenstecheri, Ceram, Röber, CB. Iris, p. 40, pl. ii, fig. 10; *A. dulla*, Key Is., Pag., JB. nass. Ver. xxxix, p. 115; *A. bieti*, Thibet, Ch. Oberth., Bull. Soc. Ent. Fr. (6) v, p. ccxxviii, figured, Études d'Ent. xi, pl. xi, fig. 12: n. spp.

Ægocera cornigera, Australia, Butl., Tr. E. Soc. 1886, p. 381, n. sp.

Eusemia medeba, fig. 4, *opheltes*, Druce, fig. 5, figured; Waterh., Aid, pl. 172.

E. thruppi, Somali, Butl., P. Z. S. 1885, p. 775, n. sp.

CHALCOSIIDÆ, CTENUCHIDÆ, and DIOPTIDÆ.

[Cf. Druce (247), Edwards (160), Moore (465), Oberthur (491).]

Chalcusia bieti, Thibet, Oberth., Études d'Ent. xi, p. 29, pl. vi, fig. 40, n. sp.

Codane leucomelas, Siam, Moore, J. A. S. B. lv, p. 97, n. sp.

Pedoptila nemopteridea, Butl., figured; Waterh., Aid, pl. 165, fig. 1.

Milionia, cf. *Lithosiidæ*.

Bintha, cf. *Zyganiidæ*.

Clenucha vittigera, Bl., larva and pupa described; Berg., An. Soc. Arg. xxi, pp. 278 & 279.

Scepsis fulvicollis, n. var. *pallens*, Colorado, Edw., Ent. Am. ii, p. 8; *gravis*, California, id. t. c. n. sp.

Lycomorpha coccinea, Arizona, Edw., Ent. Am. ii, p. 9, n. sp.

Polypates halesius, Costa Rica, *haruspex*, Panama, *creon*, Costa Rica, 1886. [VOL. XXIII.]

pl. xiv, fig. 22, *erymas*, Guatemala to Panama, pl. xiv, fig. 21, Druce, Biol. Centr. Am. Heter. i, p. 161 : n. spp.

Phanoptis (Feld.) *vitrina*, Panama, pl. xiv, fig. 26, p. 162, Druce, Biol. Centr. Am. Heter. i, n. sp.

Locha hyalina, Walk., = (*perspicua*, Butl.) ; Druce, Biol. Centr. Am. Heter. i, p. 162.

ZYGÆNIDÆ.

[*Cf.* Meyrick (439), Millière (451), Möschler (470), Pagenstecher (518), Poujade (559), Smith (666), Snellen (669).]

Zygæna sarpedon and *Z. ephialtes*, varieties of, from Pyrenees, noticed ; Bull. Soc. Ent. Fr. (6) v, p. ccxiv. *Z. jucunda*, Meis., larva described ; Blachier, MT. schw. ent. Ges. vii, p. 271.

Z. wagneri, Nice, Mill., Ann. Soc. Ent. Fr. (6) vi, p. 6, pl. i, figs. 3-7 (imago and metamorphoses), n. sp.

Triprocris, systematic position and characters of ; Möschler, Ent. Am. i, p. 227.

Procris leucopleura, *coronias*, p. 792, *cyanota*, p. 793, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, n. spp.

Hestiochora, n. g., p. 788, for *H. xanthocomma*, p. 788, *erythrota*, p. 789, Australia, n. spp., to include also *Procris tricolor* and *rufiventris*, Walk. ; Meyr., P. Linn. Soc. N.S.W. (2) i.

Syntomis rubrozonata, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) vi, p. cxvii ; *S. evar*, *wuka*, *metan*, Key Is., Pag., JB. nass. Ver. xxxix, p. 119 : n. spp.

Automolis kelleni, Humpata (W. Africa), Snell., Notes Leyd. Mus. viii, p. 1 : described at length and figured ; Snell., Tijdschr. Ent. xxix, p. 224, pl. viii, fig. 1.

Hydrusa ecliptis, p. 776, *stelotis*, *pyrrhoderia*, *hyalota*, p. 777, *leucacma*, *cyanura*, p. 778, *antitheta*, *paraula*, *anepsia*, p. 779, *pyrocoma*, *synedra*, p. 780, *hesperitis*, *macroplaca*, p. 781, *chlorometis*, *mochlotis*, p. 782, *mesothetis*, p. 783, *phepsalotis*, p. 784, *eschatias*, p. 785, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, n. spp.

Choromeles, n. g., p. 785, = (*Trianeura*, Butl., which should have been *Trineura*, which is preoccupied), for *E. geographica*, p. 785, *strepsimeris*, p. 786, Australia, n. spp. ; Meyr., P. Linn. Soc. N.S.W. (2) i.

Agaphthora, n. g. for *A. melanora*, *sphenodes*, Australia, n. spp. ; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 774.

Galethalia canobita, Jamaica, Mösch., Abh. senck. Ges. xiv, p. 29, sep. pag., pl., fig. 1, n. sp.

Idalus delicata, Jamaica, Mösch., Abh. senck. Ges. xiv, p. 29, sep. pag., pl., fig. 12, n. sp.

Thyrina (sic) *elegans*, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) vi, p. cxliii, n. sp.

Bintha aurulenta, *cyanicornis*, p. cxvi, *clathrata*, p. cxvii, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) vi, n. spp.

Cosmosoma omphale, peculiar structures in ; Smith (666) : cocoon of ; Ent. Am. i, p. 186.

EUSCHEMIDÆ and PERICOPIDÆ.

[Cf. Butler (101), Meyrick (438, 443), Moore (464, 465), Pagenstecher (518).]

Celerena, Walk., characters given; *C. proxima*, Walk., ♂ described; Meyr., Tr. E. Soc. 1886, pp. 197 & 198 : amended characters; *id.* P. Linn. Soc. N.S.W. (2) i, p. 245. *C. divisa*, Walk., described and figured; Butl., Ill. typ. Lep. vi, p. 48, p. cxiii, fig. 1.

C. ribbei, Aru Is., Pag., JB. Nass. Ver. xxxix, p. 164; *C. prodroma*, New Guinea, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 246 : n. spp.

Euschema proba, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 48, pl. cxiii, fig. 2. *E. malayana*, *palmyra*, noticed; Swinh., P. Z. S. 1885, p. 864.

E. sodalis, Tavoy, Moore, J. A. S. B. lv, pp. 99; *E. andersonii*, Mergui, *id.* J. L. S. xxi, p. 56 : n. spp.

Panathia iridicolor, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 49, pl. cxiii, fig. 3.

Milionia, cf. *Lithosiidæ*.

ARCTIIDÆ.

[Cf. Butler (95), Edwards (161), Meyrick (439), Möschler (470), Oberthur (491), Staudinger (681), Vángel (710), Wallengren (719).]

Nemophila plantaginis variation; Wocke, Z. Ent. Bresl. (2) xi, p. xxiv. *N. metelkana*, Ld., biological note on; Vángel, Rov. Lapok, iii, pp. 123 & xviii : intermediate form described; *id. t. c.* p. xxiv : habits and occurrence in France noticed; Bull. Soc. Ent. Fr. (6) vi, pp. liv & cxv.

Arctia caja, L., zur Varietäten-Erziehung von; Bergmann, Soc. Ent. i, p. 38 : influence of food-plant on coloration of; Pollack, JB. westf. Ver. 1885, p. 26. *A. michabo*, Gr., a valid species, *A. nevadensis*, and other species, note on; Grote, Canad. Ent. xviii, pp. 108-110.

Chelonia caja, teratology; White, P. E. Soc. 1886, p. xlix.

Euprepia caja n. var. *utahensis*; Edw., Ent. Am. ii, p. 166.

Arctia y-albulum, with var. *lugubris*, Thibet, Oberth., Études d'Ent. xi, p. 30; *A. cajula*, Thibet, Stdgr., Ent. M. M. xxii, p. 258, and Young, Ent. M. M. xxiii, p. 102 : n. spp.

Chelonia villica preyed on by *Exorista excavata*; Mik., Ent. Nachr. xii, p. 203.

Euprepia zerenaria, Thibet., Oberth., Études d'Ent. xi, p. 30, n. sp.

Ammobiota, n. g. for *Arctia hebe* auct.; Wallengr., Skand. Het. p. 304.

Orodemnias, n. g. for *Arctia quenselii* auct.; Wallengr., Skand. Het. p. 315.

Ocnogyna parasita, Hb., parthenogenesis, in Vángel, Rov. Lapok, iii, pp. 59 & ix.

Pyrrharctia isabella, scent-organ of; Smith, Ent. Am. i, p. 79.

Leucarctia acraea, scent-organ of; Smith, Ent. Am. ii, p. 79.

Spilosoma menthastri, Esp., parthenogenesis, in Vángel, Rov. Lapok, iii, pp. 59 & ix. *S. congrua*, Wlk., larval history; Hulst, Ent. Am. ii, p. 15. *S. zatima*, n. var. *deschangepi*, Heligoland; Dep., Ann. Soc. Ent. Fr. (6) vi, p. 283, pl. iv, fig. 4.

S. erythrastis, Lizard I., Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 753, n. sp.

Amerila brachyleuca, serica, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 765, n. spp.

Daritis thetis, Kl., n. var. *howardi*; Edw., Ent. Am. ii, p. 165.

Ecpantheria persola, Jamaica, Mösch., Abh. senck. Ges. xxv, p. 33, sep. pag., pl., fig. 15, n. sp.

Halesidota texta, H. S., metamorphoses; Weyenb., Tijdschr. Ent. xxix, pp. 120-122, pl. iv, figs. 2-8.

H. laqueata, Texas, Edw., Ent. Am. ii, p. 166; *H. elota*, p. 33, sep. pag., pl., fig. 29, *mendax*, p. 34, Jamaica, Mösch., Abh. senck. Ges. xiv: n. spp.

Nelphe carolina, Florida, Edw., Ent. Am. ii, p. 166, n. sp.

Pinara, Walk.: the genus referred to *Lasiocampidae*, its composition by Walker noticed; Butl., Tr. E. Soc. 1886, p. 387.

P. rufescens, Australia, Butl., Tr. E. Soc. 1886, p. 387, n. sp.

Metacrias, n. g., for *M. erichrysa*, N. Zealand, n. sp., p. 749, and to include *Phaos huttonii*, Butl.; Meyr., P. Linn. Soc. N.S.W. (2) i.

Ethmia gnophrina, Feld., cf. *Atasthalistis*, n. g., *Tineide*.

Tortricomorpha, cf. *Tineidae*.

LITHOSIIDÆ.

[Cf. Butler (95, 100), Edwards (160), Meyrick (438, 439), Moore (465), Möschler (470), Pagenstecher (518), Poujade (559), Snellen (670, 671).] N.B.—The following arrangement is chiefly alphabetical.

Æmena punctatissima, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) vi, p. clix, n. sp.

Aletis monteironis, Druce, figured; Waterh., Aid, pl. 172, fig. 2.

Amesia hyala, Druce, figured; Waterh., Aid, pl. 172, fig. 3.

Asura habrotis, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 748, n. sp.

Autoceras mixta, p. 31, sep. pag., pl., fig. 4, *sordida*, p. 32, fig. 9, Jamaica, Mösch., Abh. senck. Ges. xiv, n. spp.

Azia tawan, Aru Is., Pag., JB. nass. Ver. xxxix, p. 127, n. sp.

Barsine coccinea, Tavoy, Moore, J. A. S. B. lv, p. 98, n. sp.

Bizone rubrifasciata, Druce, figured; Waterh., Aid, pl. 172, fig. 1.

B. bifasciata, p. cxxiv, *interrogationis*, p. cxxv, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) vi, n. spp.

Brunia harpophora, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 701, n. sp.

Calamidia salpinctis, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 694, n. sp.

Calligenia pyraula, p. 704, *cyclota*, *melitaula*, p. 705, Queensland, Meyr., P. Linn. Soc. N.S.W. (2) i; *C. suavis*, *quadrilineata*, Aru Is., Pag., JB. nass. Ver. xxxix, p. 126: *C. carnea*, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) vi, p. cxliii: n. spp.

Chiriphe stenopa, p. 732, *catarrhoa*, Australia, *procrena*, Tasmania, p. 733, *dichotoma*, p. 734, *dictyota*, p. 735, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, n. spp.

Cluaca struthias, Australia, Meyr., P. Linn. Soc. N. S. W. (2) i, p. 715, n. sp.

Cyptasia: the structure shows affinity to *Micro-Lepidoptera*; Butl., Tr. E. Soc. 1886, p. 383.

U. cristata, Gayndah, Butl., Tr. E. Soc. 1886, p. 383, n. sp.

Datana ministra, Drur., food-plants of; Beut., Ent. Am. ii, p. 78: contagious diseases of; Forbes, Bull. Illin. Lab. N. H. ii, pp. 295-305.

Diastrophia dasypyga, Feld., referred to *Teulizna*, and described from Australia; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 700.

Eudemia ruficollis, Hb., larva and pupa described; Berg, An. Soc. Arg. xxi, p. 279.

Gnoph. rubricollis in large numbers in sea-drift; Teich, S. E. Z. xlvii, p. 168.

Hazis, cf. *Geometridæ*.

Hypoprepia plumbea, Minnesota, Edw., Ent. Am. ii, p. 9, n. sp.

Hypocrita albicollis, New Guinea, Pag., JB. Nass. Ver. xxxix, p. 125; *H. ? aurantiaca*, Sumatra, Snell., Tijdschr. Ent. xxix, p. 33, pl. i, fig. 1, and Notes Leyd. Mus. viii, p. 4: n. spp.

Leucopsunis cryptochroa, Walk., position noticed, = (*Turckheimia lynkerii*, Dewitz); Mab., Bull. Soc. Ent. Fr. (6) vi, p. excviii.

Lithosia cereola, Hb., eggs and larvæ described, Schöyen, Om de tidligere udviklingstadier af *L. cereola*; Ent. Tidskr. 1886, pp. 189 & 190.

L. cinerea, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) vi, p. cl; *L. chionora*, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 702: n. spp.

Mevania ? subcyanea, Walk., noticed; Mösch., Abh. senck. Ges. xiv, p. 32, sep. pag.

Milionia luteo-fasciata, New Guinea, Pag., JB. Nass. Ver. xxxix, p. 162; *M. sharpei*, Borneo and E. India, Butl., Ann. N. H. (5) xviii, p. 7: n. spp.

Mitochondria simulans, Rockhampton, Butl., Tr. E. Soc. 1886, p. 382, n. sp.

Mosoda ophiodes, p. 729, *servilis*, p. 731, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, n. spp.

Nola longiventris, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) vi, p. cli; *N. flexuosa*, Mou-Pin, id. t. c. p. clxvii; *N. metallopa*, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 726: n. spp.

Nudaria maculata, Thibet, Pouj., Bull. Soc. Ent. Fr. (6) vi, p. cl, n. sp.

Pitane erkunin, Aru Is., Pag., JB. Nass. Ver. xxxix, n. sp.

Sorocostia paroxynia, *trigonota*, p. 719, *semograptia*, *irenica*, p. 720, *paromæa*, p. 721, *aulacota*, p. 722, *parallacta*, *cycota*, p. 723, *arachneis*, *epicentra*, p. 724, *leucoma*, p. 725, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, n. spp.

Stenele; *Ohrysauga lutescens*, Butl., figured and referred to, p. 162, pl. xiv, fig. 27; Druce, Biol. Centr. Am. Heter. i, p. 162.

Tegulata squamata, Aru Is., Pag., JB. Nass. Ver. xxxix, p. 124, n. sp.

Teinopyga humacta, Java, Sumatra, Snell., Notes Leyd. Mus. viii, p. 3, n. sp.

Termessa conographa, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 714, n. sp.

Tigrioides heminephes, p. 697, *spilarcha*, p. 699, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, n. spp.

Uteheisa, on the American species of, treating them as one; Möschler, Ent. Am. ii, pp. 73-75.

Afrida, n. g. near *Hola*, for *A. tortriciformis*, Jamaica, n. sp.; Mösch., Abh. senck. Ges. xiv, p. 30, sep. pag., pl., fig. 19.

Xanthodule, n. g. for *X. semiochrea*, Australia, n. sp.; Butl., Tr. E. Soc. 1886, p. 384, pl. ix, fig. 1.

Palæxera, n. g. for *P. phyllodes*, Australia, n. sp.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 699.

Symmetrodes, n. g. for *Lithosia nitens*, Walk.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 703.

Heterallactis, n. g. for *H. euchrysa*, Australia, n. sp.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 703.

Hectobrocha, n. g., p. 706, for *H. pentacyma*, Australia, n. sp., p. 707; Meyr., P. Linn. Soc. N.S.W. (2) i.

Neobrocha, n. g., p. 707, for *N. phæocyma*, Thursday I., Torres Straits, *adoxa*, Australia, p. 708; n. spp.; Meyr., P. Linn. Soc. N.S.W. (2), i.

Parelictis, n. g. for *P. saleuta*, Australia, n. sp.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 709.

Hestiarcha, n. g. for *H. pyrrhopa*, Australia, n. sp.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 736.

Thallarcha, n. g., p. 736, for *T. phalarota*, p. 736, *phædropa*, p. 737, *chrysocharaes*, p. 738 (to include also *Pitane albicollis*, Feld.), Meyr., P. Linn. Soc. N.S.W. (2) i: n. spp.

Comarchis, n. g., p. 739, for *C. isophragma*, Tasmania, *chrysochoa*, p. 740, *lochaga*, p. 742, *staurocola*, p. 743, Australia, n. spp., to include also *Mosoda jocularis*, Ros., *Pitane amanda*, and *delita*, Feld., *Conchylis sparsana* = (*Pallene gracilis*, Butl.), and *Æcophora aspectatella*, Walk.; Meyr., P. Linn. Soc. N.S.W. (2) i.

Peronetis, n. g. for *P. ænodora*, New Guinea, n. sp.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 242; *Cyme* (?) *ochropyga* and *pardalina*, Feld., referred to it; *id. t. c.* p. 243.

Exotrocha n. g. for *Noctua liboria*, Cr. (*Lithosia lib.*, Feist.); Meyr., P. Linn. Soc. N.S.W. (2) i, p. 693.

Scoliacma, n. g., p. 695, for *Lithosia bicolora*, Bois., and *S. orthotoma*, *pactolias*, Australia, p. 696, n. spp.; Meyr., P. Linn. Soc. N.S.W. (2) i.

Sœodora, n. g. for *S. omophanes*, p. 731, *chionastis*, p. 801, Australia, Meyr., P. Linn. Soc. N.S.W. (2) i: n. spp.

Anestia, n. g., p. 745, for *A. ombrophanes*, Australia, n. sp., p. 746; Meyr., P. Linn. Soc. N.S.W. (2) i.

+ *Derrhis*, n. g. for *Nudaria mundana* auct.; Wallengr., Skand. Het. p. 259.

Samera, n. g. for *Lithosia muscerda* auct.; Wallengr., Skand. Het. p. 271.

HYPSIDÆ, NYCTEOLIDÆ, and NYCTEMERIDÆ.

[Cf. Butler (95, 101), Meyrick (438, 439), Edwards (160).]

Hypsa basilissa, p. 767, *nesophora*, p. 770, Meyr., P. Linn. Soc. N.S.W. (2) i: n. spp.

Vitessa, cf. *Pyralidæ*.

Chloephoridæ: the method by which the imagines of escape from cocoons; Poulton, Tr. E. Soc. 1886, p. 161.

Earias frondosana, Walk., figured and described; Butl., Ill. typ. Lep. vi, p. 14, pl. cv, fig. 1.

E. smaragdina, Australia, Butl., Tr. Ent. Soc. 1886, p. 388; *E. oblita*, Texas, Edw., Ent. Am. ii, p. 9: n. spp.

Tyana callichlora, Walk., figs. 2 & 3, *speculatrix*, Butl., fig. 4, *chloroleuca*, Walk., figs. 5 & 6, *pustulifera*, Walk., fig. 7, *lancina*, Butl., fig. 8, *falcata* (sub *Hylophila*), Walk., fig. 9, figured and described; Butl., Ill. typ. Lep. pl. cv, pp. 14-16.

Ctimene, Bois., characters of given, p. 241; *C. synestia*, New Guinea, n. sp.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 242.

Nyctemera annulata, Bois., and *N. amica*, White, noticed; Meyr., Ent. M. M. xxiii, p. 15. *N. tertiana*, n. n. for *latistriga*, Snell., nec Walk.; *id. loc. cit.*

LIPARIDÆ.

[Cf. Butler (92, 95, 101), Druce (247), Meyrick (438), Mieg (445), Pagenstecher (518), Poulton (560), Snellen (670, 671).]

Orgyia antiqua, biological note on; Meves, Ent. Tidskr. 1886, pp. 99-101. *O. leucographa*, Walk., variation noticed; Edw., Ent. Am. ii, p. 13. *O. leucostigma*, eversible gland in larva of; Packd., Am. Nat. xx, p. 814. *O. pudibunda* larva, eversible gland in; Poulton, Tr. E. Soc. 1886, p. 159.

Artaxa paraneura, New Guinea, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 244, n. sp.

Penora onaba, Panama, pl. xv, figs. 2 & 3, p. 164, *ombrea*, Costa Rica, pl. xv, fig. 8, p. 165, Druce, Biol. Centr. Am. Heter. i, n. spp.

Xenosoma nigromarginatum, Costa Rica, pl. xv, fig. 4, *nicander*, Costa Rica and Panama, pl. xv, fig. 6, p. 165, Druce, Biol. Centr. Am. Heter. i, n. spp.

Caviria substrigosa, Walk., figured, pl. xv, fig. 1; Druce, Biol. Centr. Am. Heter. i.

Archylus guttifuscia, Walk., figured, pl. xv, fig. 14; Druce, Biol. Centr. Am. Heter. i.

Carama plumosa, Butl., figured, pl. xv, fig. 7; *C. minuta*, Panama, n. sp.; Druce, Biol. Centr. Am. Heter. i, p. 168.

Chionophasma, n. g., p. 384, for *C. paradoxa*, Australia, n. sp., p. 385, pl. ix, fig. 2; Butl., Tr. E. Soc. 1886.

Leptocneria, n. g., near *Ocneria*, for *L. binotata*, Australia, n. sp.; Butl., Tr. E. Soc. 1886, p. 386, pl. ix, fig. 3.

Ocneria dispar, abb. *semiobscura*, and *erebus*, Darlington; Mieg., Le Nat. viii, p. 237.

Psilura monacha ab. *transiens*, Europa sep.; Mieg., Le Nat. viii, p. 237.

Leucoma margaritacea, Sumatra, Snell., Tijdschr. Ent. xxix, p. 35, pl. 1, fig. 2, and Notes Leyd. Mus. viii, p. 6, n. sp.

Euproctis guttulata (Vollenh. i. litt.), Sumatra, Snell., Notes Leyd. Mus. viii, p. 7, and Tijdschr. Ent. xxix, p. 36, pl. i, fig. 3, n. sp.

Porthesia aliena, Australia, Butl., Tr. E. Soc. 1886, p. 386; *P. gracilior*, Aru Is., Pag., JB. Nass. Ver. xxxix, p. 131: n. spp.

Porthetria obfuscata, Walk., larva described; Butl., P. Z. S. 1886, p. 386.

Artaxa scintillans, Walk., distinctions of sexes; Butl., P. Z. S. 1886, p. 385.

A. anguligera, India, Butl., P. Z. S. 1886, p. 385, n. sp.

Lymantria simplex, Aru Is., Pag., JB. Nass. Ver. xxxix, p. 132, n. sp.

Dasychira abietis, on rearing of; Czec., Z. Ent. Bresl. (2) xi, pp. 1-4.

Cnethocampa pityocampa, var. described and figured; Mill., Ann. Soc. Ent. Fr. (6) vi, p. 6, pl. i, fig. 2. *C. processionea* and *pityocampa*, vesicating properties; Goossens (250).

Cypra, Bois., characters of given; Meyr., p. 243, P. Linn. Soc. N.S.W. (2) i.

Olene, cf. *Rilia lanceolata*, *Notodontidae*.

PSYCHIDÆ.

[Cf. Heylaerts (291, 292), Speyer (677).]

Eumeta layardi, Moore, ♀ described; Heyl., C.R. ent. Belg. 1886, p. clxxiv.

E. weyersi, Sumatra, Heyl., C.R. ent. Belg. 1886, p. clxxii; *E. tjipannensis*, Java, id. t. c. p. xiv.: n. sp.

Kophene butleri, Sumatra, Heyl., C.R. ent. Belg. 1886, p. clxxiii, n. sp.

Chalia riemsdyki, Sumatra, Heyl., C.R. ent. Belg. 1886, p. clxxiii, n. sp.

Psyche helicinella and *crenulella*: systematic characters, variation, distribution, parthenogenesis, &c., discussed; Speyer, S. E. Z. xlvii, pp. 325-350. *P. ecksteini*, Led., *zelleri*, Ma., parthenogenesis in; Vängel, Rov. Lapok, iii, pp. 59 & ix.

Thyridopteryx ephemeraformis, Haw., notes on; Macf., J. Trenton Soc. i, pp. 1-6: parasites of; Ashmead, Canad. Ent. xviii, p. 97.

NOTODONTIDÆ, PHALERIDÆ, and MUSTILIDÆ.

[Cf. Butler (92, 101), Edwards (160, 161), Möschler (470), Poulton (560), Swinhoe (693).]

Dicranura vinula: larva, attitude of, p. 156; fluid ejected by tested, p. 157; mode of destruction by *Paniscus cephalotes*, pp. 162-168; failure of its protection, p. 158; Poulton, Tr. E. Soc. 1886: ravages of; Orm., Rep. ix, pp. 65 & 66: secretion of larva; P. E. Soc. 1886, p. lii. *D. furcula* larva, complex gland in; Poulton, Tr. E. Soc. 1866, pp. 157 & 158.

Cerura liturata, Walk., referred to *Harpyia*, figured, pl. cvi, fig. 7, and described, p. 19; Butl., Ill. typ. Lep. vi.

Somera viridifusca, Walk., described and figured; Butl., Ill. typ. Lep. vi, p. 20, pl. civ., fig. 7.

Nadata niveiceps, Walk., figured and described; Butl., Ill. typ. Lep. vi, p. 21, pl. civ, fig. 8.

Porsica ingens, Walk., figured and described; Butl., Ill. typ. Lep. vi, p. 21, pl. civ, fig. 9.

Besaia rubiginea, Walk., figured and described; Butl., Ill. typ. Lep. vi, p. 22, pl. civ, fig. 10.

Ossonoba torpida, Butl., figured and described; Butl., Ill. typ. Lep. vi, p. 22, pl. cvi, fig. 8.

Tarsolepis (sub *Crino*) *fulgurifera*, Walk., figured and described, pl. cvi, fig. 9, p. 23; Butl., Ill. typ. Lep. vi.

Damata longipennis, Walk., figured and described, pl. cvi, fig. 10, p. 24; Butl., Ill. typ. Lep. vi.

Calodasys mustelina, Packd., larva of; French, Canad. Ent. xviii, p. 92.

Gluphisia tealei, *wrightei*, California, *ridenda*, p. 11, *rupta*, Colorado, *albofascia*, *formosa*, Utah, p. 12, Edw., Ent. Am. ii; *G. severa*, California, *id. t. c.* p. 167: n. spp.

Lophodonta plumosa, Colorado, Edw., Ent. ii, p. 14, n. sp.

Apateledes indistincta, Florida, n. sp., *torrefacta* n. var. *floridana*; Edw., Ent. Am. ii, p. 13.

Icthyura cupreata, India, Butl., P. Z. S. 1886, p. 387; *I. argentea*, Darjiling, Butl., Ill. typ. Lep. vi, p. 24, pl. cii, fig. 12; *I. luculenta*, Indiana, *jocosa*, Florida, p. 10, *astoriae*, Oregon, p. 11, Edw., Ent. Am. ii; *I. bifaria*, California, *id. t. c.* p. 167: n. spp.

Pheosia portlandia, Oregon, Edw., Ent. Am. ii, p. 168, n. sp.

Seirodonta bilineata, Packd., larva of; French, Canad. Ent. xviii, p. 49.

Pygara bucephala, moulting of larva; Staint., Ent. M. M. xxiii, p. 140.

Bireta galbana, E. India, Swinh., P. Z. S. 1886, p. 438, pl. xl, fig. 5, n. sp.

Dabarita subtilis, Walk., figured and described; Butl., Ill. typ. Lep. vi, p. 27, pl. cvii, figs. 6 & 7.

D. icterica, E. India, Swinh., P. Z. S. 1886, p. 439, pl. xl, fig. 8, n. sp.

Gadera incitans, Walk., figured and described; Butl., Ill. typ. Lep. vi, p. 27, pl. cvii, fig. 5.

Sybrida inordinata, Walk., figured and described; Butl., Ill. typ. Lep. vi, p. 28, pl. cvii, fig. 8.

Lophopteryx saturata, Walk., described and figured; Butl., Ill. typ. Lep. vi, pl. cvii, fig. 1, p. 25.

Calpe orthograpta, Darjiling, Butl., Ill. typ. Lep. vi, p. 25, pl. cvii, fig. 1, n. sp.

Cyphanta xanthochlora, Walk., described and figured; Butl., Ill. typ. Lep. p. 25, pl. cvii, fig. 3.

Oræsia emarginata, Fab., = (*tentans*, Walk.), figured and described; Butl., Ill. typ. Lep. vi, p. 26, pl. cvii, fig. 4.

Heterocampa cervina, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 35, sep. pag., pl., fig. 28, n. sp.

Asteroscopus nubeculosus, Esp., biology; Amelang, Ent. Nachr. xii, pp. 41-44; transl., Ent. xix, p. 57.

Rilia lanceolata, Walk., referred to *Olene*, Hubn. (*Liparidæ*), re-described and figured; Butl., Ill. typ. Lep. vi, p. 1, pl. cvi, fig. 6.

Elasmia, n. g. for *E. lignosa*, n. sp., Jamaica, pl., fig. 30; Möschl., Abh. senck. Ges. xiv, p. 36, sep. pag.

Discophlebia catocalina, Feld., ♀ = (*lucasii*, Ros.) ; Meyr., Ann. N. H. (5) xvii, p. 530.

Phalera raya, Moore, fig. 1, *parivala*, Moore, fig. 2, *arenosa*, Butl., fig. 3, *sangana*, Moore, fig. 4, *stigmigera*, Butl., fig. 5, figured and described, pp. 8-10, pl. ciii ; Butl., Ill. typ. Lep. vi.

Gargetta costigera, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 11, pl. ciii, fig. 6.

Callenia elongata, Butl., figured and redescribed ; Butl., Ill. typ. Lep. vi, p. 11, pl. ciii, fig. 7.

Menapia xanthophila, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 12, pl. civ, fig. 1.

Antheua discalis, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 12, pl. civ, figs. 2 & 3.

Zana lignosa, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 13, pl. civ, fig. 4.

Ramesa tosta, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 13, pl. civ, fig. 15.

Hyperieschra pallida, Butl., figured and redescribed ; Butl., Ill. typ. Lep. vi, p. 13, pl. civ, fig. 6.

Mustilia columbaris, India, Butl., P. Z. S. 1886, p. 387, pl. xxxv, fig. 7, n. sp.

LIMACODIDÆ.

[Cf. Butler (95, 101), Edwards (160), Möschler (470), Snellen (670, 671), Swinhoe (693).]

Limacodes parallela, Florida, Edw., Ent. Am. ii, p. 10, n. sp.

Lithacodes laticlavia, Clem., a valid species, characters for ; Edw., Ent. Am. ii, pp. 9 & 10.

Monoleuca obliqua, Florida, Edw., Ent. Am. ii, p. 10, n. sp.

Scopelodes sericea, Butl., redescribed and figured, fig. 6 ; Butl., Ill. typ. Lep. vi, p. 3, pl. ci.

S. testacea = (*unicolor*, Walk., nec Westd.), Silhet, fig. 5, *ursina*, N. India, figs. 7 & 8, Butl., ll. c. ; *S. pullivittata*, Sumatra, Snell., Notes Leyd. Mus. viii, p. 9, and Tijdschr. Ent. xxix, p. 38, pl. i, fig. 4 : n. spp.

Phocoderma, n. g. for *Gastropacha velutina*, Koll., of which *Natada rugosa*, Walk., is a synonym ; Butl., Ill. typ. Lep. vi, p. 4 ; the insect figured, pl. cii, fig. 1.

Miresa bracteata, Walk., fig. 2, *discedens*, fig. 3, figured and described ; Butl., Ill. typ. Lep. vi, p. 5, pl. cii.

Candyba punctata, Walk., recorded from Brazil, = (*Belgorcea subnotata*, Walk.) ; Swinh., P. Z. S. 1886, p. 439.

Susica pallida, Walk., figured, pl. cii, fig. 4 ; Butl., Ill. typ. Lep.

S. cosmiana, E. India, Swinh., P. Z. S. 1886, p. 440, n. sp.

Parasa bicolor, Walk., fig. 11, *repanda*, Walk., fig. 5, *pastoralis*, Butl., fig. 9, figured and described, pl. cii, pp. 6 & 7 ; Butl., Ill. typ. Lep. vi.

Neomiresa herbifera, Walk., figured ; Butl., Ill. typ. Lep. vi, pl. 7.

Natada rufescens, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 7, pl. cii, fig. 10.

Cania sericea, Walk., figured ; Butl., Ill. typ. Lep. vi, p. 8, pl. cii, fig. 7.

Aphendala transversata, Walk., figured and described ; Butl., Ill. typ. Lep. p. 8, pl. cii, fig. 8.

Doratifera ordinata, Australia, Butl., Tr. E. Soc. 1886, p. 388, n. sp.

Alarodia, n. g. for *A. nana*, n. sp., Jamaica ; Möschl., Abh. senck. Ges. xiv, p. 35, sep. pag.

DREPANULIDÆ.

[Cf. Butler (92, 101).]

Drepana specularis, Moore, figured and described ; Butl., Ill. typ. Lep. vi, p. 18, pl. cvi, fig. 3.

Auzata semipavonaria, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 18, pl. cvi, fig. 1.

Callidrepana ochrea, Darjiling, Butl., Ill. typ. Lep. vi, p. 17, pl. cv, fig. 10, n. sp.

Agnidra specularia, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 17, pl. cv, figs. 11 & 12. *A. usta*, Darjiling, p. 17, pl. cvi, fig. 2, *id. t. c.*, n. sp.

Argyria cinerea, India, Butl., P. Z. S. 1886, p. 387, pl. xxxv, fig. 8, n. sp.

Draconipteris, Walk., referred to *Saturniidae* ; Druce, Biol. Centr. Am. Lep. Heter. i, p. 186.

Macroclia, n. g., p. 18, for *Argyris mystica*, Walk., the insect figured and described, pl. cvi, fig. 4, p. 19 ; Butl., Ill. typ. Lep. vi.

SATURNIIDÆ and ENDROMIDÆ.

[Cf. Druce (151, 247), Müller (475), Oberthur (491), Smith (665), Wailly (718), Weyenbergh (733).]

Saturniidae, subterranean pupation of ; P. E. Soc. 1885, p. xv. List of 6 Natal species with subterranean pupæ ; Crowley, P. Z. S. 1886, p. 297.

Copaxa lavendera, Westw., = (*plenkeri*, Feld.) ; Druce, Biol. Centr. Am. Heter. i.

C. trötschi, Panama, pl. xvii, fig. 3, p. 174 ; Druce, Biol. Centr. Am. Heter. i, n. sp.

Automeris janus, Cr., = (*Saturnia metzli*, Sallé) ; Druce, Biol. Centr. Am. Heter. i, p. 176 ; *A. banus*, Bois., pls. xvi, fig. 8, & xvii, fig. 1, *cecrops*, pl. xvi, fig. 7, *saturata*, Walk., pl. xvii, fig. 9, *larra*, Walk., pl. xviii, fig. 1, *mendosa*, Bois., pl. xvi, fig. 6, figured ; *id. t. c.*

A. zurobara, Panama, pl. xvii, fig. 2, p. 177, *averna*, Mexico, pl. xvii, fig. 4, *boucardi*, pl. xvii, figs. 5 & 6, p. 178, *zugana*, Panama, pl. xvii, fig. 7, *zozine*, Mexico, pl. xvii, fig. 8, p. 179, *belti*, Nicaragua, pl. xviii, figs. 2 & 3, p. 180, Druce, Biol. Centr. Am. Heter. i, n. spp.

Gamelia anableps, Feld., synonymy discussed ; Druce, Biol. Centr. Am. Heter. i, p. 183.

Antheraea pernyi : biology ; Gauckler, Ent. Nachr. xii, pp. 86-88 : on the rearing of ; Bigot, Bull. Soc. Acclim. (4) iii, p. 334, Fallou, *t. c.* p. 200, Bull. Soc. Ent. Fr. (6) vi. p. xxxi, Royet, Ann. Soc. Agric. Lyon, viii, pp.

237-242, and Gauckler, Ent. Nachr. xii. p. 363. *A. paphia*, L., rearing of; Dumaine, Ent. xix, pp. 110-118. *A. tirrhea* infested by *Perilampus maurus*; P. E. Soc. 1886, p. lii. *A. chapata*, Westw., figured, pl. xix, fig. 1; Biol. Centr. Am. Heter. i.

Antheraea dolabella, E. Cent. Africa, Druce, P. Z. S. 1886, p. 409, pl. xxxviii, fig. 2, n. sp.

Bunea pygela, E. Africa, Druce, P. Z. S. 1886, p. 409, pl. xxxviii, fig. 1, n. sp.

Attacus cynthia: rearing of; Fallou, Bull. Soc. Acclim. (4) iii, p. 202, Bull. Soc. Ent. Fr. (6) vi, p. xxx, and Lauzanue, Bull. Soc. Finistère, viii, p. 23: double cocoons of; Pine, J. Trenton Soc. i, p. 13. *A. yama-mai*, rearing of; Bigot, Bull. Soc. Acclim. (4) iii, p. 331. *A. cecropia*, ♂, coupled for 13 hours with *Sphinx ligustri*, ♀; Weniger, Le Nat. viii, p. 255. *A. hesperus*, L., ♀ = (*Bombyx splendida*, Pal.); Druce, Biol. Centr. Am. Heter. i, p. 189.

A. albidus, Cameroon Mountains, Druce, P. Z. S. 1886, p. 409, pl. xxxvii, fig. 1, n. sp.

Actias luna, rearing of; Bull. Soc. Ent. Fr. (6) vi, p. xxxii, and Fallou, Bull. Soc. Acclim. (4) iii, p. 199.

Arsenura arcae, Panama, pl. xix, figs. 2 & 3, p. 185; *A. (?) championi*, Costa Rica to Panama, pl. xviii, fig. 4, p. 186, Druce, Biol. Centr. Am. Heter. i: n. spp.

Saturnia pyri in N. Europe; Ent. Tidskr. 1886, p. 144: parthenogenesis in; Vángel; Rov. Lapok, iii, pp. 59 & ix. *S. boisduvalii*, *jarakowski*, *diana*, *japonica*, *artemis*, *pernyi*, larvæ or habits noticed; Bull. Soc. Ent. Fr. (6) vi, p. xlvi. *S. (sub Bombyx) oubie*, Guer., = (*S. zadduchii*, Dewitz); Butl., P. Z. S. 1885, p. 776.

Saturnia bieti, pl. vii, fig. 58, *davidi*, pl. vii, fig. 51, p. 31, Oberth., Études d'Ent. xi, n. spp.

Io burmeisteri, Cordova, Weyenb., Tijdschr. Ent. xxix, p. 117, pls. iii, figs. 5, 6, & 7, & iv, fig. 1, n. sp.

Ceratocampa imperialis, L., note on; Weyenb., Tijdschr. Ent. xxix, p. 114.

Hemileuca maia, n. var. *lucina*; Edw., Ent. Am. ii, p. 14.

Aglia tau, copulation of; Fleischer, Ent. Nachr. xii, p. 191: varieties described; *A. lugens*, n. var.; Standfuss, S. E. Z. xlvii, pp. 318-322.

Calosaturnia, n. g. for *C. mendocino*, Behrens; Smith, P. U. S. Nat. Mus. ix, p. 432.

Draconipteris, Walk. (*Drepanulide*) placed in *Saturniide*; Druce, Biol. Centr. Am. Heter. i, p. 187.

BOMBYCIDÆ and LASIOCAMPIDÆ.

[Cf. Butler (92, 95, 101), Camboué (105), Druce (151, 247), Millière (451), Poujade (559), Sasaki (630), Swinhoe (693), Wailly (718).]

"Uji" silkworm disease in Japan; Sasaki (630).

Bombyx mori, parthenogenesis of; Tichomiroff (701): bacteria and contagious disease of; Forbes, Bull. Illin. Lab. N. H. ii, pp. 277-295.

Prismosticta fenestrata, Butl., redescribed and figured ; Butl., Ill. typ. Lep. vi, pl. cvi, fig. 5, p. 20.

Theophila mandarina, Moore, its silk, and hybridisation with *Bombyx mori* noticed ; Le Nat. viii, p. 255.

Palustra uruguayensis, Monte Video, Berg, Bull. Soc. Ent. Fr. (6) v, p. ccxii, n. sp.

Eacles imperialis, Dru., list of its food-plants ; Beut., Ent. Am. ii, p. 53.

E. magnifica, Walk., pl. xv, fig. 13, *mexicana*, Grote & Rob., pl. xv, fig. 11, figured ; Druce, Biol. Centr. Am. Heter. i.

E. splendens, Mexico, pl. xv, fig. 12, p. 169, Druce, Biol. Centr. Am. Heter. i, n. sp.

Dryocampa dissimilis, Boisd., figured, pl. xv, figs. 9 & 10 ; Druce, Biol. Centr. Am. Heter. i.

D. assimilis, Mexico, pl. xv, fig. 5, p. 170, Druce, Biol. Centr. Am. Heter. i, n. sp.

Adelocephala, H.-S., noticed, and *Othorene*, Boisd., included in it ; *A. boisduali* = (*O. mexicana*, Bois.), p. 171, the insect figured, pl. xvi, figs. 1 & 2 ; *A. hügei*, Mexico, pl. xvi, fig. 9, p. 172, n. sp. ; Druce, Biol. Centr. Am. Heter. i.

Syssphinx molina, Cr., = (*Psephophæctes simulatilis* and *Adelocephala grandis*, Grote & Rob.) ; Druce, Biol. Centr. Am. Heter. i, p. 172.

Coloradia clazomenia, Panama, pl. xvi, fig. 5, *marathusa*, Costa Rica, pl. xvi, figs. 3 & 4, p. 173, Druce, Biol. Centr. Am. Heter. i, n. spp.

Dirphia (sub *Ithomisa*) *kinkelini*, Oberth., larva, pupa, and ♀ described ; Berg., An. Soc. Arg. xxi, pp. 279 & 280.

Bombyx rubi, L., parthenogenesis in ; Vängel, Rov. Lapok, iii, pp. 59 & ix. *B. quercus*, L., biological note ; Lampa (386).

B. ? flavomarginata, Mou-Pin, Pouj., Bull. Soc. Ent. Fr. (6) vi, p. xcii, n. sp.

Cosmotriche exposita, Lew., = (*Pæcilogaster hebes* and *P. brevis*, Walk., also ? *Bombyx myceria*, Boisd.) ; Butl., Tr. E. Soc. 1886, p. 387.

C. indistincta, Australia, Butl., Tr. E. Soc. 1886, p. 387, n. sp.

Lebeda repanda, Walk., redescribed and figured, figs. 1 & 2, *bimaculata*, Walk., redescribed and figured, figs. 3 & 4, and referred to *Suana*, p. 2, pl. ci ; Butl., Ill. typ. Lep. vi.

Borocera madagascariensis, Bois., and *cajanus*, Vinson, are one species, which is named *P. bibindandy*, n. n. ; some particulars as to eggs, &c. ; Camboué, Bull. Soc. Acclim. (4) iii, pp. 508-512. *B. madinika*, Madagascar, p. 511, n. sp.

Trabala irrorata, Moore, ♀ described ; Moore, J. L. S. xxi, p. 55.

Eupterote ignavus, E. India, Swinh., P. Z. S. 1886, p. 440, pl. xli, fig. 1, n. sp.

Stibolepis sylvia, Cameroons, Druce, P. Z. S. 1886, p. 410, n. sp.

Chrysopoloma rosea, Delagoa Bay, pl. xxxviii, fig. 3, *citrina*, fig. 4, Old Calabar, Druce, P. Z. S. 1886, p. 410, n. spp.

Lechenopteryx fulvia, Zanzibar, Druce, P. Z. S. 1886, p. 411, n. sp.

Phricodia arcae, Panama, Druce, Biol. Centr. Am. Heter. i, p. 193, n. sp.

Dirphia citrina, Guatemala, Brit. Honduras, pl. xx, fig. 6, *hügei*,

Mexico, pl. xx, figs. 10 & 11, p. 194, *rosea*, Mexico, pl. xx, figs. 7 & 8, p. 195, *menander*, Nicaragua, Panama, pl. xx, fig. 9, p. 196, Druce, Biol. Centr. Am. Heter. i, n. spp.

Hylesia alinda, Guatemala, Panama, pl. xx, fig. 3, *acuta*, N. Mexico, pl. xx, figs. 1 & 2, *H. (?) lineata*, Costa Rica, pl. xx, figs. 4 & 5, p. 197, Druce, Biol. Centr. Am. Heter. i, n. spp.

Oxytenis lonomica, Guatemala, Panama, pl. xxi, fig. 1, *malecena*, Panama, pl. xxi, fig. 2, p. 198, *leprea*, Panama, pl. xxi, figs. 3 & 4, p. 199, Druce, Biol. Centr. Am. Heter. i, n. spp.

Lonomia electra, Guatemala, pl. xxi, figs. 7 & 8, p. 199, *concordia*, Panama, pl. xxi, fig. 6, *cluacina*, Panama, pl. xxi, fig. 5, p. 200, Druce, Biol. Centr. Am. Heter. i, n. spp.

Quadrina diazoma, Grote, noticed and referred to *Cossidæ*; Smith, Ent. Am. ii, p. 124.

Pinara, cf. *Arctiidae*.

ZEUZERIDÆ.

[Cf. Butler (95, 101).]

Prionoxystus robinie and allies, systematic position of; Grote, Canad. Ent. xvii, p. 98.

Acritocera, n. g., next *Langsdorfia*, p. 389, for *A. negligens*, Viti Is., n. sp., p. 390; Butl., Tr. E. Soc. 1886, pl. ix, fig. 4.

Zenzera pusilla, Walk., fig. 9, *conferta*, fig. 10, pl. cvii, *leuconota*, pl. cviii, figs. 1 & 2, Walk., figured and described, p. 28; Butl., Ill. typ. Lep. vi.

Duomitus ligneus, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 29, pl. cviii, fig. 3.

HEPIALIDÆ.

[Cf. Butler (101), Edwards (160), Moore (465), Poujade (559).]

Hepialus humuli, flight and pairing of; Chapman, Ent. M. M. xxiii, pp. 164 & 165. *H. hectus*, odour, and habits; Ent. M. M. xxiii, p. 110. *H. letus*, Stgr., probably a var. of *sylvinus*, L.; Bohatsch, Wien. ent. Z. v, p. 124. *H. lupulinus*, ravages of; Orm., Rep. ix, pp. 8-10. *H. virescens*, fungus of; Hamilton, Tr. N. Z. Inst. xviii, p. 212. *H. marcidus*, Butl., p. 29, pl. cviii, figs. 4 & 5, *pauperatus*, Walk., p. 30, figs. 6 & 7, figured and described; Butl., Ill. typ. Lep. vi.

H. davidi, Mou-Pin, Pouj., Bull. Soc. Ent. Fr. (6) vi, p. xcii; *H. tavoyanus*, Tavoy, Moore, J. A. S. B. lv, p. 98; *H. meglashani*, California, Edw., Ent. Am. ii, p. 14: n. spp.

Phassus aboë, Moore, fig. 1, *signifer*, Walk., fig. 2, *damor*, Moore, fig. 3, figured, pl. cix, and described, pp. 30 & 31; Butl., Ill. typ. Lep. vi.

CYMATOPHORIDÆ.

Thyatira, = (*Gaurena*, Walk.), *florens*, Walk., fig. 4, *florescens*, Walk., fig. 5, figured, pl. cix, described, p. 32; Butl., Ill. typ. Lep. pp. 31 & 32.

NOCTUIDÆ.

[Cf. Bates (33), Behr (41), Butler (92, 95, 97, 101), Edwards (161), Kellicott (343), Mieg (445), Moore (465), Möschler (470), Pagenstecher (518), Poulton (560), Snellen (670, 671, 674), Swinhoe (693).]

Listonia, n. g. of doubtful affinities, p. 37, sep. pag., for *L. jamaicensis*, n. sp., Jamaica, p. 38, pl., fig. 13; Möschl., Abh. senck. Ges. xiv.

Algonia, n. g. of doubtful affinities, for *A. mollis*, Jamaica, n. sp., pl., fig. 3; Möschl., Abh. senck. Ges. xiv, p. 39, sep. pag.

Acronycta leporina, darkening of hairs of larva before pupation; Poulton, Tr. E. Soc. 1886, p. 160.

Apatela lobeliae, larva of; French, Canad. Ent. xviii, p. 118.

Leucania albipuncta, broods of, noticed; Tijdschr. Ent. xxix, p. xxvi. *L. decissima*, Walk., fig. 6, *hamifera*, Walk., fig. 7, figured, pl. cix, and described, pp. 33 & 34; Butl., Ill. typ. Lep. vi.

L. byssina, E. India, Swinh., P. Z. S. 1886, p. 442, pl. xl, fig. 6; *L. diatrecta*, *lewini*, p. 390, *scottii*, *cruegeri*, p. 391, *alaroides*, p. 392, Australia, Butl., Tr. E. Soc. 1886: n. spp.

Eurypsycha, n. g., near *Leucania*, for *E. similis*, Australia, n. sp., Butl., Tr. E. Soc. 1886; p. 392, pl. ix, fig. 6.

Nonagria brevilinea, life-history; Fletcher, Ent. M. M. xxii, p. 272: habits; Wheeler, t. c. p. 274. *N. cannae*, habits of; Wheeler, t. c. pp. 169-172.

N. subcarnea, N. America, Kell., Bull. Buff. Soc. v, pp. 40-44, woodcuts, metamorphoses, &c., n. sp.

Arzama densa, Walk., = (*Sphida obliquata*, Grote); Riley, P. E. S. Wash. i, p. 30.

Prodenia infecta, Walk., fig. 8, *glaucastriga*, fig. 9, figured, pl. cix, described, pp. 34 & 35; Butl., Ill. typ. Lep. vi.

P. exquisita, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 41, sep. pag., pl., fig. 23, n. sp.

?*Grammophora floccifera*, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 41, sep. pag., pl., fig. 7, n. sp.

Laphygma angustipennis, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 43, sep. pag., pl., fig. 14, n. sp.

Dianthæcia casia, Bkh., metamorphoses, p. 1, pl. i, figs. 1-4; n. var. *doubledayi*, Epping; Mill., Nat. Sicil. vi.

Charax graminis, L., ravages of; Orm., Rep. ix, pp. 12-14: and its parasites, note on; Nerén, Ent. Tidskr. pp. 43-50 & 133.

Mamestra dissimilis, Knoch, *egena*, Ld., and *dianthi*, Tausch., noticed; Bohatsch, Wien. ent. Z. v, p. 125. *M. picta*, Harris, contagious disease of; Forbes, Bull. Illin. Lab. N. H. ii, pp. 305-312.

M. soligena, p. 45, sep. pag., fig. 18, *distributa*, p. 46, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 46, n. spp.

Raphia frater, var. *coloradensis*; Cram., Ent. Am. ii, p. 142.

R. pallula, California, Edw., Ent. Am. ii, p. 168, n. sp.

Perigea fasciata, Colorado, Edw., Ent. Am. ii, p. 169, n. sp.

Harrisimemna sexguttata, Har., larva of; Goodhue, Canad. Ent. xviii, p. 58.

- Caradrina striolata*, Fiji Is., Butl., Tr. E. Soc. 1886, p. 393, n. sp.
Tornos, cf. *Geometridæ*.
Alibama, n. g., p. 43, sep. pag., near *Caradrina*, for *A. pulchra*, fig. 27, *mutata*, fig. 5, Jamaica, Möschl., Abh. senck. Ges. xiv, n. spp.
Radinogoes, n. g., near *Caradrina*, p. 393, for *R. tenuis*, Australia, n. sp.; Butl., Tr. E. Soc. 1886, p. 394, pl. ix, fig. 8.
Brotis vulnerata, Hub., note on; Fischer, Canad. Ent. xviii, p. 72; and = (*Sphecelodes floridensis*, Holld.) ; Hulst, t. c. p. 136.
Agrotis occulta, ab. *passetii*, Scotland; Mieg., Le Nat. viii, p. 237. *A. segetum*, ravages of; Orm., Rep. ix, pp. 74-81, and x, pp. 84-87. *A. messoria*, Harr., ravages, habits, &c.; Riley, Rep. 1885, pp. 270-275, pl. vii, fig. 1. *A. improcera*, Ersch., with others, noticed; Bohatsch, Wien. ent. Z. v, pp. 124 & 125. *A. cinerea*, var. from Livonia; Teich., S. E. Z. xlvii, p. 169. *A. rubi* var. *florida*, origin of; Stange, S. E. Z. xlvii, p. 279. *A. pronuba*, dark individual procured by delaying the development of pupa by means of cold; *id.* t. c. p. 279. *A. hospitalis*, Grote, note on; Grote, Canad. Ent. xviii, p. 220. *A. aversa*, Walk., = (*Caradrina trituratora*, *id.*); Butl., P. Z. S. 1886, p. 380.
A. lassa, E. India, Swinh., P. Z. S. 1886, p. 444; *A. mulina*, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 47, sep. pag.: n. spp.
Noctua carnea, Thunb., trivial name discussed; Thoms, Deutsche e. Z. xxx, p. 32.
N. variicollis, Algeria, Delahaye, Bull. Soc. Ent. Fr. (6) vi, p. lxiii, n. sp.
Epilecta (sub *Triphaena*), *semiherbida*, Walk., figured and described, pl. cx, fig. 1, p. 34; Butl., Ill. typ. Lep. vi.
Cerastis silene, Grasl., and *C. gallica*, Led., noticed; Bull. Soc. Ent. Fr. (6) vi, p. ccxiv.
Dasyampa staudingeri, Grasl., noticed; Bull. Soc. Ent. Fr. (6) v, p. ccxiii.
Xanthia fulvago, variation noticed; Hall, P. E. Soc. 1886, p. 53.
Cosmia curvata, Japan, Butl., Tr. E. Soc. 1886, p. 131, n. sp.
Leucocosmia, n. g., near *Enargia*, for *L. ceres*, Fiji Is., n. sp.; Butl., Tr. E. Soc. 1886, p. 394, pl. ix, fig. 10.
Dysbatus, n. g., near *Cosmia*, for *D. singularis*, Australia, n. sp.; Butl., Tr. E. Soc. 1886, p. 395, pl. ix, fig. 5.
Euperia sambuci, California, Behr, Bull. Cal. Ac. Sci. 1885, p. 61, n. sp.
Atethmia canescens, California, Behr, Bull. Cal. Ac. Sci. 1885, p. 61, n. sp.
Iphimorpha, Hb., characters for, p. 47, sep. pag. *I. liquida*, Jamaica, p. 48, pl. fig. 17, Möschl., Abh. senck. Ges. xiv, n. sp.
Hadena, the type of genus, and position of some species discussed; Butl., Tr. E. Soc. 1886, p. 135 (sub *Dichonia*). Om hvitaxflyet *Hadena secalis*, L.; Lampa, Ent. Tidskr. 1886, pp. 57-71 & 135. *H. monoglypha*, Hufn., ab. *obscura*, England; Mieg., Le Nat. viii, p. 237.
H. praecegens, p. 49, sep. pag., pl., fig. 21, *pupula*, fig. 22, *trita*, p. 50, Jamaica, Möschl., Abh. senck. Ges. xiv, n. spp.
Epia claripennis, Japan, Butl., Tr. E. Soc. 1886, p. 134, n. sp.
Dichonia intermissa, Japan, Butl., Tr. E. Soc. 1886, p. 134, n. sp.

- Radinaera variana*, E. India, Swinh., P. Z. S. 1886, p. 444, pl. xl, fig. 10, n. sp.
- Calocampa solidaginis*, habits, &c. ; Hoffman, S. E. Z. xlvii, p. 161. *C. cineritia*, Grote, preparatory stages ; Clark, Am. Nat. xx, p. 168 : var. *thoracica*, Cram, Ent. Am ii, p. 142.
- Crambodes minor*, Australia, Butl., Tr. E. Soc. 1886, p. 397, n. sp.
- Crioa acronyctina*, Australia, Butl., Tr. E. Soc. 1886, p. 397, n. sp.
- Heliothis aberrans*, Australia, Butl., Tr. E. Soc. 1886, p. 405, n. sp.
- Canthylidia*, n. g., near *Heliocheilus*, for *C. pallida*, Australia, n. sp. ; Butl., Tr. E. Soc. 1886, p. 406, pl. ix, fig. 9.
- Plusiodonta arctipennis*, Sydney, Butl., Tr. E. Soc. 1886, p. 407, n. sp.
- Pradatta beatrix*, Moore, described and figured ; Swinh., P. Z. S. 1886, p. 442, pl. xli, fig. 5.
- Anarta*, Tr., geographical distribution of species of ; Lehmann, Z. Ent. Bresl. (2) xi, p. xiv.
- A. mimuli*, California, Behr, Bull. Cal. Ac. Sci. 1885, p. 62, n. sp.
- Anthæcia divitiosa*, Walk., cf. *Hypertropha*, *Tineida*.
- Aporocosmus*, n. g., near *Agrophila*, p. 398, for *A. bracteatus*, Australia, n. sp., p. 399, pl. ix, fig. 7 ; Butl., Tr. E. Soc. 1886.
- Acontia judicata*, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 35, pl. cx, fig. 3.
- A. badia*, E. India, Swinh., P. Z. S. 1886, p. 445 ; *A. amorphæ*, Gayndah, vitiensis, Fiji Is., p. 399, *tripartita*, *nivipicta*, p. 401, *detrita*, p. 401, *clarissa*, *conchidia*, p. 402, Australia, Butl., Tr. E. Soc. 1886 : n. spp.
- Phothedes frausa*, E. India, Swinh., P. Z. S. 1886, p. 446, n. sp.
- Hiccoda herbaria*, E. India, Swinh., P. Z. S. 1886, p. 446, n. sp.
- Tarache nivosa*, E. India, Swinh., P. Z. S. 1886, p. 446, pl. xli, fig. 14, n. sp.
- Leocyma* (sub *Chasmina*) *cygnus*, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 35, pl. cx, fig. 3.
- Erastria fasciolata*, Australia, Butl., Tr. E. Soc. 1886, p. 403, n. sp.
- Bankia argentula*, ova and larvæ described ; Brown, Ent. M. M. xxiii, p. 5.
- Galgula sores*, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 51, sep. pag., n. sp.
- Thalpochares communimacula*, Hb., systematic position of, noticed ; Bohatsch, Wien. ent. Z. v, p. 126.
- T. leonata*, *pusilla*, p. 404, *innocens*, p. 405, Australia, Butl., Tr. E. Soc. 1886, n. spp.
- Metachrostis*, *Leptosia*, and *Leptidia*, synonymy noticed ; Butl., Tr. E. Soc. 1886, p. 403.
- M. paurograpta*, Australia, Butl., Tr. E. Soc. 1886, p. 403, n. sp.
- Anthophila vestalis*, Australia, Butl., Tr. E. Soc. 1886, p. 405 ; *A. innubila*, p. 447, *pulchra*, p. 451, E. India (the latter species placed in *Euclidiide* by the author), Swinh., P. Z. S. 1886 : n. spp.
- Brepheos infans*, Möschl., note on ; Snellen, Tijdschr. Ent. xxix, p. 137.
- Cyclodes spectans*, Amboina, Snell., Tijdschr. Ent. xxix, p. 228, pl. viii, fig. 2, n. sp.
- Eriopus jamaicensis*, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 52, sep. pag., pl., fig. 24, n. sp.

Ingura pallida, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 53, sep. pag., n. sp.

Plusia orichalcea : *Sagaritis punctata*, Bridgm., is parasite of ; Tr. E. Soc. 1886, p. 349. *P. ciliaris*, Walk., fig. 5, *nigrisigna*, Walk., fig. 4, figured pl. cx, described p. 36 ; Butl., Ill. typ. Lep. vi.

P. vaccinii, N. America, Edw., Ent. Am. ii, p. 170 ; *P. humeralis*, Japan, Butl., Tr. E. Soc. 1886, p. 136 : n. spp.

Westermannia argentata, *concha*, Australia, Butl., Tr. E. Soc. 1886, p. 396, n. spp.

Deva morigera, Colorado, Edw., Ent. Am. ii, p. 169, n. sp.

Gonitis samoana, p. 407, Samoa Is., *vitiensis*, *vulpina*, p. 408, *xanthochroa*, p. 409, Fiji Is., Butl., Tr. E. Soc. 1886, n. spp.

Penicillaria excitans, India, Butl., P. Z. S. 1886, p. 381, n. sp.

Toxocampa orthosiodes, Walk., and *Pantydium recondita*, *id.*, are identical ; Butl., Tr. E. Soc. 1886, p. 414.

T. orientalis, India, Butl., P. Z. S. 1886, p. 381, n. sp.

Polydesma vulgaris, Japan, Butl., Tr. E. Soc. 1886, p. 136, n. sp.

Eurythmus, n. g., allied to *Diatenes*, p. 409, for *E. bryophiloides*, Australia, n. sp., p. 410 ; Butl., Tr. E. Soc. 1886.

Girpa maxima, p. 410, *carnea*, p. 411, Vavao, Butl., Tr. E. Soc. 1886, p. 411, n. spp.

Briarda decens, Walk., fig. 6, *precedens*, fig. 7, figured pl. cx, described p. 37 ; Butl., Ill. typ. Lep. vi.

Homoptera cruegeri, Australia, Butl., Tr. E. Soc. 1886, p. 411, n. sp.

Gadirtha pulchra, Australia, Butl., Tr. E. Soc. 1886, p. 412, n. sp.

Barcita, n. g., near *Hypogramma*, for *B. muscosa*, Jamaica, n. sp., pl., fig. 11, Möschl., Abh. senck. Ges. xiv, p. 54, sep. pag.

Arcte nigrescens, Darjiling, pl. cx, fig. 8, p. 38, n. sp., Butl., Ill. typ. Lep. vi.

Bolina limitata, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 55, sep. pag., pl., fig. 16, n. sp.

Benina ephesioides, Aru Is., Pag., JB. nass. Ver. xxxix, p. 136, pl. x, fig. 4, n. sp.

Catocala, markings and processes of larvæ of ; White, P. E. Soc. 1886, p. xvi ; and reproduced, Am. Nat. xx, p. 812. *C. pacta*, L., var. from Livonia described ; Teich, S. E. Z. xlvii, p. 169. *C.*, Canadian species of, described ; Bowles, Rep. E. Soc. Ont. xvi, pp. 55-60. *C.*, notes on N. American, with *C. amasia*, var. *virens* n. var. ; French, Canad. Ent. xviii, pp. 161 & 162. *C. obscura*, *habilis*, larvæ described ; Kell., Ent. Am. ii, p. 465. *C. retecta* and *flebilis*, correction as to ; *id. l. c.* *C. prolifera*, Walk., p. 38, pl. cx, fig. 9, *concubia*, Walk., fig. 10, *unicuba*, Walk., fig. 11, *sponsalis*, Walk., pl. cxi, fig. 1, p. 39, figured and described ; Butl., Ill. typ. Lep. vi.

Pleonectyptera obliquialis, Texas, Edw., Ent. Am. ii, p. 171, n. sp.

Potamophora hugeni, Sumatra, Snell., Notes Leyd. Mus. viii, p. 12, n. sp. (cf. Zool. Rec. xxii, *Ins.* p. 197).

Ophideres sultana, Sumatra, Snell., Notes Leyd. Mus. viii, p. 10, and Tijdschr. Ent. xxix, p. 39, pl. i, fig. 5 ; *O. kühni*, New Guinea, Pag., JB. nass. Ver. p. 137, pl. x, fig. 6 : n. spp.

Phyllodes conspicillator, Cr., var. (an. n. sp. ?), Aru Is., described; Pag., JB. nass. Ver. xxxix, p. 138.

Thysania agrippina, note on, with wood engraving of imago and larva; Le Nat. 1886 (1), p. 360.

Sypna mormoides, Butl., pl. cxi, fig. 2, p. 40, *umbrosa*, Butl., fig. 3, *cælisparsa*, Walk., fig. 4, *pulchra*, Butl., fig. 5, p. 41, *apicalis*, Butl., fig. 6, *tenebrosa*, Butl., fig. 7, p. 42, *lucilla*, Butl., fig. 8, *obscurata*, Butl., fig. 9, p. 43, *albilinea*, Walk., pl. cxii, fig. 1, *moorei*, Butl., pl. cxii, fig. 2, p. 44, figures and descriptions of; Butl., Ill. typ. Lep. vi.

Pheocyma lunifera, Hb., noticed; Riley, Rep. 1885, p. 327: metamorphoses; Packd., Bull. Dep. Agric. Ent. No. 12, pp. 22 & 23.

Nyctipao exterior, Butl., fig. 3, *glaucopis*, fig. 4, figured, pl. cxii, described, p. 45; Butl., Ill. typ. Lep. vi. *N. ephesperis*, var. described; Pag., JB. nass. Ver. xxxix, p. 139.

N. ribbei, Aru Is., Pag., JB. nass. Ver. xxxix, p. 140, pl. x, fig. 2, n. sp.

Entomogramma falcata, Key Is., Pag., JB. nass. Ver. xxxix, p. 141, n. sp.

Phoberia indiscreta, California, Edw., Ent. Am. ii, p. 170, n. sp.

Grammodes rogenhoferi, Boh., = (*mirabilis*, Rom.); Bohatsch, Wien. ent. Z. v, p. 126.

Ophiusa conficiens, Walk., fig. 5, *properata*, fig. 6, figured, pl. cxii, described, pp. 45 & 46; Butl., Ill. typ. Lep. vi.

O. vitiensis, Fiji, Butl., Tr. E. Soc. 1886, p. 414, n. sp.

Pseudophia nebuligera, Australia Butl., Tr. E. Soc. 1886, p. 413, n. sp.

Hypatra sordida, Fiji, Butl., Tr. E. Soc. 1886, p. 414, n. sp.

Acantholipes acervalis, E. India, Swinh., P. Z. S. 1886, p. 451, n. sp.

Remigia virbia, Cram., = (*Hypatra diffundens*, Walk.); Butl., Tr. E. Soc. 1886, p. 414.

R. discrepans, Fiji, Butl., Tr. E. Soc. 1886, p. 415, n. sp.

Focilla angularis, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 57, sep. pag., pl., fig. 8, n. sp.

Zethes? albonotata, Sumatra, Snellen, Tijdschr. Ent. xxix, p. 41, pl. ii, fig. 1, and Notes Leyd. Mus. viii, p. 14; *Z. tawan, lara*, Aru Is., Pag., JB. nass. Ver. xxxix, p. 146 : n. spp.

Amphigonina comprimens, Walk., figured and described; Butl., Ill. typ. Lep. vi, p. 46, pl. cxii, fig. 7.

Hingula unicoloris, E. India, Swinh., P. Z. S. 1886, p. 452, n. sp.

Erosia, Gn., referred to *Thermesiidae*, and *Dirades* is a part of it; Butl., Tr. E. Soc. 1886, p. 416.

Thermesia creberrima, Walk., figured and described; Butl., Ill. typ. Lep. vi, p. 47, pl. cxii, fig. 8.

T. punctulata, Aru Is., Pag., JB. nass. Ver. xxxix, p. 147, n. sp.

Mestleta baccalix, E. India, Swinh., P. Z. S. 1886, p. 452, pl. xl, fig. 7, n. sp.

Platyja lobifera, Siam, Moore, J. A. S. B. lv, p. 101, n. sp.

Celiptera bifasciata, Florida, Bates, Canad. Ent. xviii, p. 94, n. sp.

Argidia penicillata, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 58, sep. pag., n. sp.

Capnoides bistriga, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 59, sep. pag., n. sp.

DELTOIDIDÆ.

[*Cf.* Butler (95), Möschler (470), Pagenstecher (518, 519), Snellen (670, 671), Swinhoe (693).]

Malopa recta, Ceram, Pag., CB. Iris. p. 43, pl. ii, fig. 6, n. sp.

Hypena approximatis, p. 43, pl. ii, fig. 2, *fractilinealis*, p. 45, pl. ii, fig. 3, Sumatra, Snell., Tijdschr. Ent. xxix, and Notes Leyd. Mus. pp. 16 & 17; *H. triangularis, obtectalis*, p. 63, sep. pag., *leniusculalis*, p. 64, Jamaica, Möschl., Abh. senck. Ges. xiv; *H. (?) eximia*, Ceram, Pag., CB. Iris, p. 43, pl. ii, fig. 8 : n. spp.

Rhynchina xyliua, E. India, Swinh., P. Z. S. 1886, p. 452, n. sp.

Ballonicha, n. g., near *Phimodium*, for *B. recurvata*, Jamaica, n. sp.; Möschl., Abh. senck. Ges. xiv, p. 60, sep. pag., pl., fig. 6.

Berocynta, n. g., near *Solepia*, for *B. simplex*, Jamaica, n. sp.; Möschl., Abh. senck. Ges. xiv, p. 61, sep. pag.

Anagoa, n. g., affinities not stated, for *A. ophiuroides*, Jamaica, n. sp., pl., fig. 31; Möschl., Abh. senck. Ges. xiv, p. 62, sep. pag.

Simplicia griseolimbalis, Sumatra, Snell., Tijdschr. Ent. xxix, p. 47, pl. ii, fig. 4, and Notes Leyd. Mus. viii, p. 20, n. spp.

Zanclognatha monochroa, New Guinea, Pag., JB. nass. Ver. xxxix, p. 149, n. sp.

Bocana synpoides, Fiji, Butl., Tr. E. Soc. 1886, p. 416, n. sp.

Lophocoleus, n. g., near *Bocana*, p. 416, for *L. mirabilis*, p. 416, pl. x, fig. 1, and *L. ? astrifer*, Fiji, n. spp.; Butl., Tr. E. Soc. 1886.

Mateomera, n. g., allied to *Rivula*, for *M. dubia*, Australia, n. sp.; Butl., Tr. E. Soc. 1886, p. 418, pl. x, fig. 2.

Eulocastru, n. g., next *Locastru*, for *E. fasciata*, n. sp., Sydney; Butl., Tr. E. Soc. 1886, p. 419, pl. x, fig. 6.

Pinacia pupillalis, Sumatra, Snell., Notes Leyd. Mus. viii, p. 20, n. sp. [*cf.* Zool. Rec. xxii, *Ins.* p. 202].

GEOMETRIDÆ.

[*Cf.* Bates (33), Brown (87), Butler (92, 95, 101), Hulst (314-319), Kellicott (344), Meyrick (438, 441, 443), Mieg (445), Millière (451), Moore (463, 465), Oberthur (491, 492), Pagenstecher (518, 519), Poulton (560), Snellen (670, 673), Swinhoe (692, 693).]

Geometridæ to consist of "seven families," which are tabulated; Meyrick, Tr. E. Soc. 1886, pp. 190 & 191.

Meyrick, Tr. N. Z. Inst. xviii, p. 184, proposes the following new names to replace others preoccupied, viz:—*Paradetis*, n. n. for *Parysatis*, Meyr.; *Pancyma*, n. n. for *Panopæa*, Meyr.; *Homodotes*, n. n. for *Eurydice*, Meyr.; *Probolæa*, n. n. for *Harpalyce*, Meyr.; *Arctesthes*, n. n. for *Stratonice*, Meyr.; *Asaphodes*, n. n. for *Thyone*, Meyr.; *Aulapola*, n. n. for *Hermione*, Meyr.; *Epicyme*, n. n. for *Hippolyte*, Meyr.; *Anachloris*, n. n. for *Arsinoë*, Meyr.; *Notoreas*, n. n. for *Pasiþea*, Meyr.; *Stathmonyma*, n. n. for *Statira*, Meyr.; *Epicasis*, n. n. for *Atossa*, Meyr.; *Gonophylla*, n. n. for *Phyllodoce*, Meyr.; *Sestra*, Walk., = (*Amastris*, Meyr.), *id. l. c.*

Urapteryx sciticaudaria, Walk., fig. 5, *clara*, Butl., fig. 6, figured, pl. cxiii, described, p. 50; Butl., Ill. typ. Lep. vi.

U. primularis, Darjiling, pl. cxiii, fig. 4, p. 49, Butl., *t. c.*; *U. yerburii* India, Butl., P. Z. S. 1886, p. 388 : n. spp.

Thinopteryx nebulosa, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 51, pl. cxiii, fig. 8.

Euchera pitmani, Tavoy, Moore, J. A. S. B. lv, p. 99, n. sp.

Therina fervidaria, Hb., *seminudaria*, Walk., earlier stages; Packd. in Riley Rep. 1885, pp. 328-329.

Ripula virginaria, Florida, Hulst, Ent. Am. i, p. 202, n. sp.

Eugonia autumnaria, Werneb., note on; Snellen, Tijdschr. Ent. xxix, p. 137.

Eutrappela anfractata, Arizona, Hulst, Ent. Am. i, p. 202, n. sp.

Lagyra talaca, Walk., figured, pl. 185, fig. 1; Moore, Lep. Ceyl. iii.

Scardamia metallaria, Walk., figured, pl. 185, fig. 2; Moore, Lep. Ceyl. iii.

Decetia, Walk., the place of the genus should be in *Enochromiidae*; *D. arenosa*, Butl., fig. 9, *rufifrontata*, fig. 10, figured, pl. cxiii, described, p. 58, Butl., Ill. typ. Lep. vi.

Epione gynopteridia, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 51, pl. cxiv, fig. 1. *E. brongusaria*, Walk., noticed; Butl., P. Z. S. 1886, p. 390.

Angerona prunaria, heredity in colour-variation of; Sintenis, SB. Ges. Dorp. vii, pp. 363-365. *A. cessaria*, Walk., figured, pl. 185, fig. 7; Moore, Lep. Ceyl. iii.

Endropia lugens, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 52, pl. cxiv, fig. 2. *E. tetrinaria*, Grote, *warneraria*, Harv., *homuraria*, G. & R., *amœnaria*, Guén., *helveolaria*, Hulst, synonymy discussed; Hulst, Ent. Am. ii, pp. 49 & 50.

E. hilumaria, p. 206, *occantaria*, *decoloraria*, *manubiaria*, N. America, *lentaria*, Florida, p. 207, Hulst, Ent. Am. i, n. spp.

Garæus cruentatus, Moore, described and figured, p. 52, pl. cxiv, fig. 3; *G. costatus*, Darjiling, p. 53, pl. cxiv, fig. 4, Butl., Ill. typ. Lep. vi, n. sp.

Metrocampa unio, Thibet, Oberth., Études d'Ent. xi, p. 32, pl. vi, fig. 43, n. sp.

Cautoloma triangulum, Thibet, Oberth., Études d'Ent. xi, p. 32, pl. ii, fig. 5, n. sp.

Orsonoba pallida, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 53, pl. cxiv, fig. 5.

Azelina arizonaria, Edw., var. = (*albomacularia*, Edw.); Hulst, Ent. Am. ii, p. 49.

A. australata, Florida, p. 205, *radiosaria*, Arizona, p. 206, Hulst, Ent. Am. i, n. spp.

Ellopiia pulchra, Butl., figured and redescribed; Butl., Ill. typ. Lep. vi, p. 56, pl. cxiv, fig. 8. *E. ferridaria*, Hubn., *endropiaria*, G. & R., *pellucidaria*, G. & R., synonymy discussed; Hulst, Ent. Am. ii, pp. 50 & 51.

E. somniaria, N. America, Hulst, Ent. Am. i, p. 208, n. sp.

Heterolocha ephelidaria, N. America, Hulst, Ent. Am. ii, p. 120, n. sp.

Rumia sulphurea, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, pl. cxiv, fig. 6, p. 54.

R. mimulina, India, Butl., P. Z. S. 1886, p. 388, n. sp.

Nematocampa limbaria, Haw., = (*filimentaria*, Guén., = *expunctaria*, Grote); Hulst, Ent. Am. ii, p. 52.

Oxydiidæ, the characters of the group noticed; Butl., Ill. typ. Lep. vi, p. 54.

Oxydia zonulata, Texas, Hulst, Ent. Am. i, p. 201, n. sp.

Litbada serixaria, Walk., described and figured; Butl., Ill. typ. Lep. vi, p. 54, pl. cxiii, fig. 7.

Metoxydia, n. g. for *Oxydia calamina*, Butl., the species being figured and described; Butl., Ill. typ. Lep. vi, p. 55, pl. cxiv, fig. 7.

Omiza pachiaræ, Walk., described and figured; Butl., Ill. typ. Lep. vi, p. 56, pl. cxiv, figs. 9 & 10.

O. pœcila, N. Guinea, Pag., JB. nass. Ver. xxxix, p. 152, pl. x, fig. 3, n. sp.

Phanix iris, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 57, pl. cxiv, fig. 11.

Leucula lacteolaria, Arizona, Hulst, Ent. Am. ii, p. 120, n. sp.

Tetracis trianguliferata, Packd., early stages of; French, Canad. Ent. xviii, p. 105. *T. cervinaria*, Packd., ♀ = (*aurantiacaria*, Packd.), p. 47, *paralleliaria*, Packd., var. = (*simpliciaria*), p. 48, *grotearia*, Packd., = (*Eugonia vidularia*, Grote), p. 49; Hulst, Ent. Am. ii. *T. paralleliaria*, Packd., = (*Eurymene excelsa*, Streck., and *T. simpliciaria*, Grote); *id.* p. 202.

T. jubararia, N. America, Hulst, Ent. Am. ii, p. 120; *T. mellitularia*, p. 202, *cavillaria*, *morsicaria*, *edwardsata*, p. 203, *geniculata*, p. 204, N. America; *id. op. cit. i* : n. spp.

Eurymene semifulva, N. Guinea, Pag., JB. nass. Ver. xxxix, p. 153;

E. arrogaria, N. America, Hulst, Ent. Am. i, p. 208 : n. spp.

Metanema novellata, *argillaria*, N. America, Hulst, Ent. Am. i, p. 204, n. spp.

Caberodes galbanaria, Arizona, Hulst, Ent. Am. i, p. 204, n. sp.

Drepanodes effuscinaria, p. 204, *hortularia*, *perizomaria*, p. 205, N. America, Hulst, Ent. Am. i; *D. syzygiaria*, N. America, *id. op. cit. ii*, p. 121 : n. spp.

Eumelea, Jard., characters given; Meyr., Tr. E. Soc. 1886, p. 196.

E. craspedias, New Guinea, Meyr., Tr. E. Soc. 1886, p. 196, n. sp.

Chilkasa, n. g., p. 852, for *C. falcata*, Bombay, n. sp., pl. lvi, fig. 2, p. 853; Swinh., P. Z. S. 1885.

Sarcinodes debitoria, Walk., pl. cxiv, fig. 12, *restitutaria*, pl. cxv, figs. 1 & 2, with var. *ægrola*, figs. 3 & 4, p. 59, *equilinearia* (sub *merguna*), Walk., figs. 5 & 6, p. 50, figured and described; Butl., Ill. typ. Lep. vi.

Desmobathridæ (n. fam. ?); Meyr., Tr. E. Soc. 1886, pp. 191 & 198.

Desmobathra, n. g., Meyr., p. 198, for *D. hesperias*, p. 198, *acrophæa*, New Hebrides, *niphoplaca*, Solomon Is., p. 199, n. spp.; Meyr., Tr. E. Soc. 1886.

Dervæna, Walk., characters of; referred to *Desmobathridæ*; *D. cœli-vagata*, Walk., described; Meyr., Tr. E. Soc. 1886, pp. 199 & 200.

Chorodna (sub *Cyclidia*) *metaphæaria*, Walk., = (*Erebomorpha semi-clusaria*, Walk.), p. 61, fig. 8, *erebusaria*, Walk., p. 62, fig. 9, figured, pl. cxv and described; Butl., Ill. typ. Lep. vi.

Hemerophila virescens, Butl., redescribed and figured ; Butl., Ill. typ. Lep. v, p. 62, pl. cxvi, fig. 1.

Hibernia progenimaria, melanism ; Porritt, Ent. M. M. xxiii, p. 40.

H. hibernaria, Bombay, Swinh., P. Z. S. 1885, pl. lvi, fig. 4, p. 862, n. sp.

Amphidasys betularia, variation of colour ; Chappell, Ent. xix, p. 253 : melanic var. from Belgium described ; C.R. ent. Belg. 1886, p. exciii : ab. *insularia*, England ; Mieg, Le Nat. viii, p. 237. *A. contectaria*, Walk., figured and described ; Butl., Ill. typ. Lep. vi, p. 60, pl. cxv, fig. 7.

A. thibetaria, Thibet, Oberth., Études d'Ent. xi, p. 32, pl. v, fig. 30, n. sp.

Cleora pulchraria, Min., habits, metamorphoses ; Packd., in Riley Rep. 1885, pp. 327 & 328.

Hypochroma crocina, Butl., fig. 2, *vigens*, Butl., fig. 3, *muscoloraria*, Walk., fig. 4, figured, pl. cxvi, and described, pp. 63 & 64 ; Butl., Ill. typ. Lep. vi.

Boarmia, Tr., characters given ; Meyr., Tr. E. Soc. 1886, p. 211. *B. repandata*, L., varr. figured ; P. S. Lond. E. S. 1886, pl. i, figs. 3 & 4.

B. crepuscularia ab. *passetti*, Wales, and *B. biundularia* ab. *nigra*, Wales ; Meig, Le Nat. viii, p. 237. *B. cinctaria* larva noticed ; Brown, Act. Soc. L. Bord. xl, p. xl. *B. plumalis*, Butl., redescribed and figured ; Butler, Ill. typ. Lep. vi, p. 64, pl. cxvi, fig. 5.

B. gleba, Poona, Swinh., P. Z. S. 1885, p. 853 ; *B. iterata*, India, Butl., P. Z. S. 1886, p. 389 ; *B. tongaica*, Tonga I., p. 432, *samoana*, Samoa, *godeffroyi*, Australia, p. 433, *id.* Tr. E. Soc. 1886 ; *B. psychastis*, New Hebrides, Meyr., Tr. E. Soc. 1886, p. 211 : n. spp.

Ophthalmodes infusaria, Walk., described and figured ; Butl., Ill. typ. Lep. vi, pl. cxvi, fig. 6.

Elphos pardicelata, Walk., described and figured ; Butl., Ill. typ. Lep. vi, p. 65.

Paraphia deplanaria, Guén., metamorphoses ; Riley, Rep. 1885, p. 328.

Gnophos sordaria, Thnb., habits and metamorphoses ; Mill., Nat. Sicil. vi, p. 7, pl. i, figs. 14 & 15. *G. obtectaria*, Walk., genus queried ; Butl., P. Z. S. 1886, p. 389. *G. obtectaria*, Walk., fig. 8, *æreus*, Butl., fig. 9, *muscosaria*, Walk., fig. 10, figured, pl. cxvi, described, p. 66 ; Butl., Ill. typ. Lep. vi.

G. lichenea, Thibet, Oberth., Études d'Ent. xi, p. 33, pl. v, fig. 33 ; *G. ? perlita*, India, Butl., P. Z. S. 1886, p. 389 : n. spp.

Argidava punctata, Butl., redescribed and figured ; Butl., Ill. typ. Lep. vi, p. 67, pl. cxvii, fig. 1.

Ateloptila, n. g. for *A. psamathopa*, New Guinea, n. sp. ; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 250.

Euipe, n. g. for *E. phalarota*, Solomon Is., n. sp. ; Meyr., Tr. E. Soc. 1886, p. 210.

Hyperythra, Gn., characters given ; *H. limbolaria* noticed ; Meyr., Tr. E. Soc. 1886, p. 212.

Ægitrichus, n. g., near *Boarmia*, for *Æ. lanaris*, Fiji, n. sp. ; Butl., Tr. E. Soc. 1886, p. 434, pl. x, fig. 4.

Lycauges albatius, Poona, Swinh., P. Z. S. 1885, p. 862, pl. lvi, fig. 5 ;

L. demissus, E. India, *id. op. cit.* 1886, p. 456; *L. proxima*, Australia, Butl., Tr. E. Soc. 1886, p. 435 : n. spp.

Tephrosia crepuscularia and *biundularia* noticed; Ent. xix, pp. 98, 158, 159, 161, 181, 183, 184, 209, 211, 254, 266, & 269: varieties; Barrett, Ent. M. M. xxiii, p. 41: specific characters, *id. t. c.* pp. 85-87, 111, & 112.

Hemithea thymiaria, attitude of larva; Poulton, Tr. E. Soc. 1886, p. 160.

Nemoria tepperaria, N. America, Hulst, Ent. Am. ii, p. 122; *N. paularia*, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 68, sep. pag. : n. spp.

Chlorosea graefaria, N. America, Hulst, Ent. Am. ii, p. 123, n. sp.

Chlorochroma neptunus, Australia, Butl., Tr. E. Soc. 1886, p. 435, n. sp.

Eucrostis, Hb., characters given; Meyr., Tr. E. Soc. 1886, p. 202.

E. erichlora, Fiji, Meyr., Tr. E. Soc. 1886, p. 203; *E. hollandaria*, *jaspidiaria*, *sallusaria*, Florida, Hulst, Ent. Am. ii, p. 122 : n. spp.

Racheospila zystearia, N. America, Hulst, Ent. Am. ii, p. 121, n. sp.

Anaploides festaria, N. America, Hulst, Ent. Am. ii, p. 121, n. sp.

Aplodes festaria, *zygotaria*, N. America, Hulst, Ent. Am. ii, p. 121, n. spp.

Phorodesma smaragdaria, Fab., larva figured; P. S. Lond. E. S. 1886, pl. i, fig. 5.

P. phyllosa, Aru Is., Pag., JB. nass. Ver. xxxix, p. 154, n. sp.

Tanaorhinus viridiluteatus, Walk., fig. 2, *dimissus*, Walk., fig. 3, *reciprocat*, Walk., fig. 4, figured, pl. cxvii, and described, pp. 67 & 68; Butl., Ill. typ. Lep. vi.

Loxochila smaragdus, Butl., redescribed, p. 69, and figured, pl. cxvii, fig. 5; Butl., Ill. typ. Lep. vi.

Geometra rigata, Hb., note on, referring it to the genus *Mesotype*, Led.; Snell., Tijdschr. Ent. xxix, p. 134. *G. smaragdaria*, life-history of; Elisha, Tr. E. Soc. 1886, pp. 465-468. *G. grata*, Butl., fig. 6, *haliaria*, Walk., fig. 7, figured, pl. cxvii, and described, pp. 69 & 70; Butl., Ill. typ. Lep. vi.

G. aperta, Bombay, Swinh., P. Z. S. 1885, p. 855, pl. lvi, fig. 7; *G. illustraria*, California, Hulst, Ent. Am. ii, p. 121 : n. spp.

Iodis, Hb., characters given; should include *Chlorochroma*, Gn.; Meyr., Tr. E. Soc. 1886, p. 203.

I. cheramota, Fiji, Meyr., Tr. E. Soc. 1886, p. 203; *I. quantula*, Bombay, Swinh., P. Z. S. 1885, p. 855, pl. lvi, fig. 6; *I. wuka*, Key Is., Pag., JB. nass. Ver. xxxix, p. 153 : n. spp.

Thalassodes, Gn., characters given; Meyr., Tr. E. Soc. 1886, p. 204. *T. distinctaria*, Walk., fig. 8, *opalina*, Butl., fig. 9, figured, pl. cxvii, and described, p. 70; Butl., Ill. typ. Lep. vi.

T. byrsopsis, New Guinea and N. Australia, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 249; *T. chloropsis*, Fiji, *id.*, Tr. E. Soc. 1886, p. 204 : n. spp.

Thalera textilis, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 71, pl. cxvii, fig. 10.

T. obnupta, Bombay, Swinh., P. Z. S. 1885, p. 855, pl. lvi, fig. 9, n. sp.

Comilena partita, Walk., fig. 11, *pictipennis*, Butl., figured, pl. cxvii, described, pp. 71 & 72; Butl., Ill. typ. Lep. vi.

C. glaucosa, Bombay, Swinh., P. Z. S. 1885, p. 855, pl. lvi, fig. 8, n. sp.
Chlorodes pastor, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 73, pl. cxvii, fig. 13.

Agathia scutuligera, Butl., fig. 1, *beata*, Butl., fig. 2, *visenda*, Butl., fig. 3, redescribed and figured, pl. cxviii, pp. 73 & 74; Butl., Ill. typ. Lep. vi.

Phrygionis auriferaria, Florida, Hulst, Ent. Am. ii, p. 188, n. sp.

Byssodes sumptuosaria, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 69, sep. pag., n. sp.

Ephyra punctaria, var. described; Harrison, Naturalist, 1886, p. 18.

E. quieta, pl. lvi, fig. 1, *subdolaria*, *fluidaria*, pl. lvi, fig. 10, Bombay, Swinh., P. Z. S. 1885, p. 856; *E. plantagenaria*, N. America, Hulst, Ent. Am. ii, p. 185: n. spp.

Synegia infixaria, Walk., figured and described, p. 75, pl. cxviii, fig. 4; Butl., Ill. typ. Lep. vi.

Anisodes hyriaria, Walk., fig. 5, *lulderdalii*, Butl., fig. 6, *punctifera*, Butl., fig. 7, *pluristriaria*, Walk., fig. 8, figured, pl. cxviii, described, pp. 75 & 76; Butl., Ill. typ. Lep. vi.

A. complectaria, *caducaria*, *decalvaria*, p. 70, *flavicostaria*, p. 71, sep. pag., Jamaica, Möschl., Abh. senck. Ges. xiv, n. spp.

Acidalia, Tr., characters given; Meyr., Tr. E. Soc. 1886, p. 205. *A. recessata*, Walk., = (*despoliata* & *optivata*, Walk.), described; *id. t. c. p.* 207. *A. incarnaria*, H.-S., metamorphoses; Mill., Ann. Soc. Ent. Fr. (6) vi, p. 8, pl. i, figs. 8 & 9. *A. luteata*, food plant; Ent. M. M. xxiii, pp. 109 & 141. *A. eriopodata*, Grasl., and *inesata*, Mill., are identical; Oborth., Bull. Soc. Ent. Fr. (6) vi, p. clxvii. *A. fumata*, Stph., metamorphoses described and figured; Mill., Nat. Sicil. vi, p. 5, pl. i, figs. 10-13. *A. quinquelineata*, n. var. *fuscata*, p. 187; Hulst, Ent. Am. ii.

A. oblongata, *volucrata*, p. 185, *dataria*, *ancellata*, *eliminaria*, p. 186, N. America, Hulst, Ent. Am. ii; *A. crossophragma*, p. 206, *amala*, p. 207, *homodoxa*, p. 208, New Guinea, Meyr., Tr. E. Soc. 1886: n. spp.

Pythodora, n. g. for *P. rhipistis*, Fiji, n. sp.; Meyr., Tr. E. Soc. 1886, p. 205.

Trichoclada, n. g. for *T. epigypsa*, Fiji, n. sp.; Meyr., Tr. E. Soc. 1886,

Perixera, n. g. for *P. ceramis*, Solomon Is., *prionades*, Fiji, n. spp.; Meyr., Tr. E. Soc. 1886, p. 209.

Eois hilliata, *bonifata*, *labeculata*, *eremiata*, *subochreatea*, n. spp., *ferrugata* n. var. *russata*, N. America, Hulst, Ent. Am. ii, p. 187.

Cambogia stellataria, *ephippiaria*, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 68, sep. pag., n. sp.

Asthena decursaria, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 71, sep. pag., n. sp.

Pigia multilineata, Arizona, Hulst, Ent. Am. ii, p. 188, n. sp.

Idwa idearia, p. 857, pl. lvi, fig. 15, *grandicularia*, pl. lvi, fig. 11, *chotaria*, pl. lvii, fig. 14, p. 858, E. India, Swinh., P. Z. S. 1885; *I. lydia*, p. 435, *jessica*, *innocens*, Australia, *nivipennis*, Fiji, p. 436, *agnes*, Australia, p. 437, Butl., Tr. E. Soc. 1886: n. spp.

Zanclopteryx infelix, Poona, Swinh., P. Z. S. 1885, p. 858, pl. lvi, fig. 13; *Z. cerulea*, Pag., JB. nass. Ver. xxxix, p. 156: n. spp.

Hyria volutaria, Bombay, Swinh., P. Z. S. 1885, p. 858, pl. lvi, fig. 14, n. sp.

Erosia himala, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 47, pl. cxii, fig. 9.

E. praeflorata, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 69, sep. pag.; *E. stolidia*, Australia, Butl., Tr. E. Soc. 1886, p. 415; *E. dobboënsis*, *nigromaculata*, Aru Is., Pag., JB. Nass. Ver. xxxix, p. 158 : n. spp.

Dirades, the species of, are males of species of *Erosia*; Butl., Tr. E. Soc. 1886, p. 415.

Strophidiadæ, n. n. proposed for *Microniadæ*; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 247.

Stesichora sphaeristis, New Guinea, P. Linn. Soc. N.S.W. (2) i, p. 247, n. sp.

Strophidia, Hb., characters given; Meyr., Tr. E. Soc. 1886, p. 201. *S. urapterina*, Butl., noticed; *id. t. c.* p. 202.

S. anerces, Fiji, Meyr., Tr. E. Soc. 1886, p. 201; *S. harmonica*, New Guinea, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 248 : n. spp.

Micronia tristriata, Key Is., p. 156, *nigroapicata*, New Guinea, p. 157, Pag., JB. Nass. Ver. xxxix, n. spp.

Stesichora, n. g. for *Micronia puellaria*, Walk.; Meyr., Tr. E. Soc. 1886, p. 200.

Anteia, n. g. for *A. ithygramma*, New Britain, n. sp.; Meyr., Tr. E. Soc. 1886, p. 201.

A. acrosema, New Guinea, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 248, n. sp.

Myrteta planaria, Walk., described and figured; Butl., Ill. typ. Lep. vi, p. 77, pl. cxviii, fig. 9.

Teldenia (sub *Corycia*) *vestigiata*, Butl., redescribed and figured, p. 77, pl. cxviii, fig. 10; Butl., Ill. typ. Lep. vi.

Tornos candidarius, *dissociarius*, n. spp.; *T. rubiginosarius* n. varr. *cinctarius*, *abjectarius*, N. America; Hulst, Ent. Am. ii, p. 192.

Asthena urbana, *tristricula*, pl. lvi, fig. 17, *querula*, fig. 16, E. India, Swinh., P. Z. S. 1885, p. 859, n. spp.

Stegania uvidula, Poona, Swinh., P. Z. S. 1885, p. 860, n. sp.

Terpnomicta quadrilineata, Sumatra, Snell., Tijdschr. Ent. xxix, p. 49, pl. ii, fig. 5, and Notes Leyd. Mus. viii, p. 21, n. sp.

Thamnonoma fuscioferaria, *coortaria*, N. America, Hulst, Ent. Am. ii, p. 191, n. spp.

Marmopteryx morrisata, p. 190, *annellata*, p. 191, N. America, Hulst, Ent. Am. ii, n. spp.

Mucaria metagonaria, Walk., fig. 11, *wanthonora*, fig. 12, described and figured, pl. cxviii, p. 78; Butl., Ill. typ. Lep. vi.

M. boaria, pl. lvi, fig. 12, *bolina*, p. 861, *infrictaria*, p. 862, Poona, Swinh., P. Z. S. 1885; *M. denticulata*, Aru Is., Pag., JB. Nass. Ver. xxxix, p. 159 : n. spp.

Evarzia indica, Butl., redescribed and figured; Butl., Ill. typ. Lep. vi, p. 79, pl. cxviii, fig. 13.

Semiothisa sexpunctata, N. America, Bates, Canad. Ent. xviii, p. 75; *S. simulata*, *metanemaria*, p. 188, *mendicata*, *sublacteolata*, *tenebrosata*, *umbri-ferata*, *inguinaria*, p. 189, *octolineata*, *delectata*, *graphidaria*, p. 190, N. America, Hulst, Ent. Am. ii : n. spp.

- Phasiane clathrata* var. ; Bull. Soc. Ent. Fr. (6) vi, p. clxvi.
P. cinereata, N. America, Bates, Canad. Ent. xviii, p. 75, n. sp.
Lozogramma famulata, p. 191, *græfiaria*, p. 192, N. America, Hulst, Ent. Am. ii, n. spp.
Plutodes transmutata, Walk., fig. 1, *discigera*, Butl., fig. 2, *flavescens*, Butl., fig. 3, *exquisita*, Butl., fig. 4, *subcaudata*, Butl., fig. 5, figured and described, pl. cxix, pp. 79-81 ; Butl., Ill. typ. Lep. vi.
Pagrasa rufescens, Butl., fig. 6, *instabilata*, Walk., fig. 7, described and figured ; Butl., Ill. typ. Lep. vi, pl. cxix, pp. 81 & 82.
Noreia sericea, Butl., redescribed, p. 82, and figured, pl. cxix, fig. 8 ; Butl., Ill. typ. Lep. vi.
Fidonia zerenaria, Mab., = (*Endropia nachtigalii*, Dewitz) ; Mab., Bull. Soc. Ent. Fr. (6) vi, p. cxviii. *F. plumistaria* var. ; t. c. p. clxvi.
Bursada placens, New Guinea, Pag., JB. nass. Ver. xxxix, p. 161, n. sp.
Milonia, vide *Lithosiidæ*.
Panagra vethi, Benguela, Snell, Tijdschr. Ent. xxix, p. 139 ; *P. rupicolor*, Australia, Butl., Tr. E. Soc. 1886, p. 438 : n. spp.
Tephрина incessaria, Walk., noticed ; Butl., P. Z. S. 1886, p. 390.
Phyletis (sub *Delocharis*) *herbicola*, Butl., var. described ; Butl., P. Z. S. 1886, p. 391.
P. inconspicua, India, Butl., P. Z. S. 1886, p. 391, n. sp.
Epifidonia, n. g., near *Fidonia*, p. 391, for *E. signata*, India, n. sp., p. 392, pl. xxxv, fig. 9 ; Butl., P. Z. S. 1886.
Numeria occiduaria, Wlk., distinct from *pulveraria*, L. ; Hulst, Ent. Am. ii, p. 51.
N. (?) griseo-sericea, p. 159, *undulataria*, pl. x, fig. 1, p. 160, Aru Is., Pag., JB. nass. Ver. xxxix, n. spp.
Hyposidra alfuraria, Ceram, Pag., CB. Iris, p. 45, pl. iii, fig. 3, n. sp.
Bupalus pinarius, L. ; *Masicera agilis*, Meig. and *Exorista flavicans*, Meig. are parasites of this : Wien. ent. Z. v, p. 307.
Sterrha sarothamnaria, Arcachon, Brown, Act. Soc. L. Bord. xl, p. lii ; *S. paulula*, E. India, Swinh., P. Z. S. 1886, p. 456, pl. xli, fig. 7 : n. spp.
Lythria sanguinaria var. ; Bull. Soc. Ent. Fr. (6) vi, p. clxvi.
Erastria scitula living 17 months as a larva ; Le Nat. viii, p. 340 : habits of larva ; Perag., Bull. Soc. Ent. Fr. (6) vi, p. cxxxiv. *E. venustula*, Hb., localities in France ; Bull. Soc. Ent. Fr. (6) vi, pp. cxcii & cxci.
Abraxas grossulariata var. figured ; Ent. xix, p. 43 : var. figured ; P. S. Lond. E. S. 1886, pl. i, fig. 2 : aberration described ; Vängel, Rov. Lapok, iii, pp. xxiv. *A. pusilla*, Butl., redescribed and figured, p. 83, pl. cxix, fig. 9 ; Butl., Ill. typ. Lep. vi.
A. davidi, Thibet, Ch. Oberth., Bull. Soc. Ent. Fr. (6) v, p. cccxxix ; figured, Études d'Ent. xi, pl. iii, fig. 16 ; *A. fuscescens*, pl. xxxv, fig. 10, *virginialis*, fig. 11, India, Butl., P. Z. S. 1886, p. 392 ; *A. rosenbergi*, Aru Is., Pag., JB. nass. Ver. xxxix, p. 165 : n. spp.
Icterodes conspersa, Butl., p. 83, pl. cxix, fig. 10, *consocia*, Butl., fig. 11, p. 84, redescribed and figured ; Butl., Ill. typ. Lep. vi.
Callabraxas amanda, Butl., redescribed and figured, p. 84, pl. cxix, fig. 12 ; Butl., Ill. typ. Lep. vi.

Vindusara metachromata, Walk., described, p. 84, and figured, pl. cxv fig. 1; Butl., Ill. typ. Lep. vi.

Erebomorpha, Walk., referred to *Zerenidæ*, near *Vindusara*; *E. fulguraria*, Walk., described, p. 85, and figured, pl. cxx, fig. 2; Butl., Ill. typ. Lep. vi.

Hazis kuhni, Aru Is., p. 162, *snelleni*, Key Is., p. 163, Pag., JB. nass. Ver. xxxix, p. 163, n. sp.

Celerena, cf. *Euschemidæ* and *Pericopidæ*, p. 253.

Euschemidæ (cf. p. 253, ante).

Cheimatobia boreata noticed; Ent. Nachr. xii, p. 125.

C. bruceata, N. America, Hulst, Ent. Am. ii, p. 123, n. sp.

Larentia, note on neururation of; Snell., Tijdschr. Ent. xxix, p. 135. *L. olivata*, Bork., var. figured; P. S. Lond. E. S. 1886, pl. 1, fig. 1.

Epyaxa rosearia, Dbld., metamorphoses, &c.; Purdie, Tr. N. Z. Inst. xviii, p. 208.

Eupithecia pusillata, *nanata*, *innotata*, *trisignaria*: habits of larvæ noticed; Stange, S. E. Z. xlvii, pp. 280 & 281. *E. undata*, For., and *multilineata*, Mn., said to belong to *E. spissilineata*, Metz.; *E. denotata*, Hd., and *atraria*, H.-Sch., noticed; Bohatsch, Wien. ent. Z. v, p. 202. *E. eynensata*, Grasl., and *magnata*, Mill., are identical; Oberth., Bull. Soc. Ent. Fr. (6) vi, p. clxvi.

E. testacea, pl. lviii, fig. 15, *conscensa*, fig. 8, *bilinea*, fig. 7, Poonah, Swinh., P. Z. S. 1885, p. 863; *E. erymna*, Tonga Is., Meyr., Tr. E. Soc. 1886, p. 192; *E. succernata*, p. 72, sep. pag., pl., fig. 20, *sucidata*, p. 73, Jamaica, Möschl., Abh. senck. Ges. xiv: n. spp.

Pasiphila lepta, Tonga & Marshall Is., Meyr., Tr. E. Soc. 1886, p. 191, n. sp.

Lobophora certata larva described; Habich, Wien. ent. Z. v, p. 60, and Soc. Ent. i, p. 5.

Hydreomena (sic) *traversata*, Michigan, Kell., Bull. Buff. Soc. v, p. 45, n. sp.

Thera contractata, Packd., metamorphoses; Packd., Bull. Dep. Agric. Ent. No. 12, pp. 21 & 22.

Hypsipetes impluviata, life-history note; Ent. M. M. xxiii, p. 88.

Melanippe lugens, Thibet, Oberth., Études d'Ent. xi, p. 34, pl. ii, fig. 4, n. sp.

Rheumaptera brunneomaculata, Massachusetts, Bates, Canad. Ent. xviii, p. 74, n. sp.

Coremia languescens, Rosk., referred to *Cephalissa*; Meyr., Ann. N. H. (5) xvii, p. 529.

Coremia picta, Fiji, Butl., Tr. E. Soc. 1886, p. 439, n. sp.

Eucosmia undulata, var. figured; Ent. xix, p. 200.

Scotosia undulata, life-history; Atmore, Ent. M. M. xxiii, p. 88.

S. albiplaga, Thibet, Oberth., Études d'Ent. xi, p. 34, pl. vi, fig. 42, n. sp.

Pterocypha emanata, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 73, sep. pag., n. sp.

Cephalissa, Meyr., characters given; *Scotosia*, Meyr. (Tr. N. Z. Inst. 1883), nec Led., merged in it: Meyr., Tr. E. Soc. 1886, p. 195.

C. delogramma, Fiji and Tonga ; Meyr., Tr. E. Soc. 1886, p. 195, n. sp.
Sauris ignobilis, Butl., redescribed and figured, p. 86, pl. cxx, fig. 3 ;
 Butl., Ill. typ. Lep. vi.

Lygranoa cinerea, Butl., redescribed and figured ; Butl., Ill. typ. Lep. vi, p. 86, pl. cxx, fig. 4.

Docirava æquilineata, Walk., fig. 5, *medmaria*, Walk., fig. 6, figured, pl. cxx, and described, pp. 86 & 87 ; Butl., Ill. typ. Lep. vi.

Remodes, Gn., characters of genus, Meyr., Tr. E. Soc. 1886, p. 193 ; *R. eluica*, Fiji, *id. loc. cit.* : n. sp.

Cretheis, n. g. (*Larentiadæ*), p. 192, for *C. cymatodes*, New Hebrides, n. sp., p. 193 ; Meyr., Tr. E. Soc. 1886.

Casbia irrorata, Australia, Butl., Tr. E. Soc. 1886, p. 438, n. sp.

Aspilates clarissa, Australia, Butl., Tr. E. Soc. 1886, p. 438, n. sp.

Melanthia gratulata, Walk. (= *Rheumaptera brunneicillata*, Packd.) ; Butl., P. Z. S. 1886, p. 393.

Panthea, Meyr., discussed ; Butl., P. Z. S. 1886, p. 391.

Cidaria, Tr., characters given ; Meyr., Tr. E. Soc. 1886, p. 194. *C. immanata*, variety of larva ; Ent. M. M. xxiii, p. 87. *C. cæsiata*, W.-V. (from which *flavicinctata*, Steph., is distinct), larva figured ; Mill., Nat. Sicil. vi, p. 8, pl. 1, fig. 16. *C. suffumata*, notes on, with an account of an attempt to rear some of the more peculiar forms which the Dover specimens assume ; Webb., P. E. Soc. 1886, pp. xxv-xxix. *C. affinitata* var. *turbaria*, habits of larva ; Stange, S. E. Z. xlvii, p. 280. *C. albigrata*, Koll., noticed ; Butl., P. Z. S. 1886, p. 394. *C. fissisignis*, Butl., fig. 7, *delecta*, Butl., fig. 8, *relata*, Butl., fig. 9, *aurigena*, Butl., fig. 10, *aliena*, Butl., fig. 11, figured pl. cxx, redescribed pp. 87-89 ; Butl., Ill. typ. Lep. vi.

C. decipiens, Sydney, Butl., Tr. E. Soc. 1886, p. 438 ; *C. perpulchra*, India, Butl., P. Z. S. 1886, p. 393 ; *C. chlorodesma*, *lasiospila*, Fiji, Meyr. Tr. E. Soc. 1886, p. 194 : n. spp.

Ortholitha limitata, Scop., habits and metamorphoses ; Graaf, Tijdschr. Ent. xxix, pp. 233-236, pl. ix, figs. 1 & 2 : ab. *monodii*, N. England ; Mieg, Le Nat. viii, p. 237.

Eubolia undulata, Rosk., is referred to *Cephalissu* ; Meyr., Ann. N. H. (5) xvii, p. 529.

Anaitis lythoxylaria, note on ; Nat. Sicil. v, p. 258. *A. præformata*, Hb., var. = (*fraudulenta*, H.-S.) ; Bohatsch, Wien. ent. Z. v, p. 200.

Stamnodes depeculata, Led., n. var. *thibetaria* ; Oberth., Études d'Ent. xi, p. 35, pl. vi, fig. 44.

PYRALIDÆ (SICULODIDÆ and MUSOTIMIDÆ).

[Cf. Butler (92, 95), Edwards (161), Hulst (313), Leech (392), Meyrick (438, 443), Moore (463), Möschler (470), Oberthur (491), Pagenstecher (518), Swinhoe (692, 693).]

Siculodidæ to be included in *Pyralidæ* ; Meyr., Tr. E. Soc. 1886, p. 212 : characters given and remarks, p. 215.

Siculodes, characters given, *S. (Pyralis) anticalis*, Walk., described ; Meyr., Tr. E. Soc. 1886, p. 215.

S. hemicycla, Fiji, Meyr., Tr. E. Soc. 1886, p. 216 ; *S. hydreutis*, New Guinea, *id.* P. Linn. Soc. N.S.W. (2) i, p. 253 ; *S. (Rhodoneura) bivittata*, *S. papuensis*, Aru Is., *ochracea, variabilis*, New Guinea, p. 166, *acutipennis*, Aru Is., p. 167, Pag., JB. nass. Ver. xxxix : n. spp.

Mesopempta, n. g. for *M. heliopsamma*, New Guinea, n. sp. ; Meyr., Tr. E. Soc. 1886, p. 217.

Microsa striatalis, Bombay, Swinh., P. Z. S. 1885, p. 875 ; *M. plagi-fera*, Tonga I., Butl., Tr. E. Soc. 1886, p. 420 : n. spp.

Pharambara reticulata, Australia, Butl., Tr. E. Soc. 1886, p. 420, n. sp.

Musotimidæ, modified definition of ; Meyr., Tr. E. Soc. 1886, p. 217.

Trieropis, n. g. (*Musotimidæ*) for *T. nesias*, Tonga, n. sp. ; Meyr., Tr. E. Soc. 1886, p. 218.

Parædis napæalis, California, Hulst, Tr. Am. Ent. Soc. xiii, p. 145, n. sp.

Prorasea lepidalis, N. America, Hulst, Tr. Am. Ent. Soc. xiii, p. 146 ;

P. brunneogrisea, Arizona, Edw., Ent. Am. ii, p. 171 : n. spp.

Emprepes insignis, Australia, Butl., Tr. E. Soc. 1886, p. 431 ; *E. mog-nalis*, Arizona, Hulst, Tr. Am. Ent. Soc. xiii, p. 147 : n. spp.

Chalcæa gemmalis, California, Hulst, Tr. Am. Ent. Soc. xiii, p. 148, n. sp.

Pachyarches pomonalis, Guén., figured, p. 182, fig. 7 ; Moore, Lep. Ceyl. iii.

Epizeuxis amula, habits and metamorphoses noticed ; Packd., Riley Rep. 1885, pp. 325 & 326.

Surattha albipennis, India, Butl., P. Z. S. 1886, p. 383, n. sp.

Pyrallis incongrua, India, Butl., P. Z. S. 1886, p. 383, pl. xxxv, fig. 5 ;

P. rubicundalis, p. 864, *roborealis*, pl. lvii, fig. 1, *quisqualis*, fig. 11, *zizani-alis*, fig. 12, *xylinalis*, fig. 17, p. 865, *recisalis*, p. 866, E. India, Swinh., P. Z. S. 1885 : n. spp.

Messatis, Walk., noticed ; Ann. N. H. (5) xvii, p. 528.

Vitessa, characters given ; *V. pyraliata*, Walk., described ; Meyr., Tr. E. Soc. 1886, pp. 212 & 213.

Aglossa griphalis (*cf. errata, op. cit.*), Colorado, *electalis*, Arizona, Hulst, Tr. Am. Ent. Soc. xiii, p. 146, n. sp.

Cledeobia oculatalis, Andalusia, Rag., Bull. Soc. Ent. Fr. (6) v, p. cci ;

C. hypotalis, Poona, Swinh., P. Z. S. 1885, p. 866 : n. spp.

Arrade massalis, Bombay, Swinh., P. Z. S. p. 866, pl. lvii, fig. 10, n. sp.

Coptobasis anealis, Bombay, Swinh., P. Z. S. 1885, p. 867, n. sp.

Pyrausta tibetalis, fig. 6, *bieti*, fig. 10, Thibet, Oberth., Études d'Ent. xi, p. 35, pl. ii, n. spp.

Graphicopoda, n. g., near *Ennychia*, for *G. hecate*, Tonga Is., n. sp. ; Butl., Tr. E. Soc. 1886, p. 421.

Syngamia, Gn., should include *Æthaloessa*, Ld., characters given ; *S. merionalis*, Walk., = (*octavialis*, Walk.) : Meyr., Tr. E. Soc. 1886, pp. 238 & 239.

Desmia confusalis, Florida, Hulst, Tr. Am. Ent. Soc. xiii, p. 158, n. sp.

Samea yerburii, India, Butl., P. Z. S. 1886, p. 383, pl. xxxv, fig. 6, n. sp.

Sameodes pipleisalis, Walk., figured ; Moore, Lep. Ceyl. iii, pl. 181, fig. 14.

Asopia leonina, Australia, Butl., Tr. E. Soc. 1886, p. 426 ; *A. enniculalis*, *occidentalis*, Colorado, *culiculis*, Florida, Hulst, Tr. Am. Ent. Soc. xiii, p. 147 : n. spp.

Rinecera nigrescens, Fiji, Butl., Tr. E. Soc. 1886, p. 424, n. sp.

Hormatholepis, n. g., allied to *Rinecera*, p. 424, for *H. erebina*, Fiji, n. sp., p. 425, pl. x, fig. 7 ; Butl., Tr. E. Soc. 1886.

Agathodes ostentalis, Geyer, noticed ; Swinh., P. Z. S. 1885, p. 868.

Leucophotis, n. g., near *Agathodes*, for *L. pulchra*, Fiji, n. sp. ; Butl., Tr. E. Soc. 1886, p. 426, pl. x, fig. 3.

Endotricha docilisalis and allies, and presumed synonyms discussed ; Butl., Tr. E. Soc. Ent. 1886, p. 428.

E. annuligera, *obscura*, Australia, Butl., Tr. E. Soc. 1886, p. 427 ; *E. plinthopa*, Samoa, Meyr., Tr. E. Soc. 1886, p. 214 ; *E. wammeralis*, Aru Is., Pag., JB. Nass. Ver. xxxix, p. 168 : n. spp.

Leucinodes auxialis, E. India, Swinh., P. Z. S. 1886, p. 458, pl. xli, fig. 12, n. sp.

Zinckenia perfuscalis, Florida, Hulst, Tr. Am. Ent. Soc. xiii, p. 159, n. sp.

Pterygisus, n. n. for *Isopteryx*, Gn. (*nec* Pict.) ; Butl., Tr. E. Soc. 1886, p. 429.

P. ochreipennis, Australia, Butl., Tr. E. Soc. 1886, p. 429, pl. x, fig. 9, n. sp.

Isopteryx, Gn. (?) characters given ; Meyr., Tr. E. Soc. 1886, p. 263. *I. signiferalis*, Wallengr., referred to *Strepsimela*, = ? (*Certoclasia barbicornis*, Feld.) ; Meyr., Tr. E. Soc. 1886, p. 250.

I. enizalis, Bombay, Swinh., P. Z. S. 1885, p. 869 ; *I. antisema*, New Hebrides, Meyr., Tr. E. Soc. 1886, p. 263 ; *I. xeniolalis*, Texas, Hulst, Tr. Am. Ent. Soc. xiii, p. 159 : n. spp.

Lepyrodes astomalis, Feld., referred to *Glyphodes*, and described at length ; Meyr., Tr. E. Soc. 1886, p. 224.

Euclasta, Led., defined ; Meyr., Tr. E. Soc. 1886, p. 225.

Stenia floridalis, Z., belongs to *Syngamia*, and = (*Glyphodes calidalis*, Gn., and *Botys vitialis*, Feld.) ; Meyr., Tr. E. Soc. 1886, p. 239.

Hymenoptychis, Zell., characters given ; Meyr., Tr. E. Soc. 1886, p. 225.

Hemimatia claudalis, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 75, sep. pag. ; *H. scalpellalis*, p. 173, *phryganidalis*, p. 174, Aru Is., Pag., JB. Nass. Ver. xxxix : n. spp.

Oligostigma unilinealis, Snell., referred to *Anydraula* ; Meyr., Tr. E. Soc. 1886, p. 221.

O. pallida, Australia, Butl., Tr. E. Soc. 1886, p. 423 ; *O. candidalis*, *argyrotozalis*, p. 176, *præstabilis*, *orphninalis*, p. 177, Aru Is., Pag., JB. Nass. Ver. xxxix : n. spp.

Niphadaza, n. gen. near *Oligostigma*, p. 422, for *N. bicolor*, Fiji, n. sp., p. 423, pl. x, fig. 8 ; Butl., Tr. E. Soc. 1886.

Heterocnephys atropygialis, p. 171, *H. (?) lunulatis*, p. 172, Aru Is., Pag., JB. Nass. Ver. xxxix, n. spp.

Gonocausta ? asuridia, Australia, Butl., Tr. E. Soc. 1886, p. 430, pl. x, fig. 5, n. sp.

Bradina metaleucalis, Walk., see *Pleonectusa*.

- Cataclysta*, Hb., defined; Meyr., Tr. E. Soc. 1886, p. 219.
- C. hexalitha*, Fiji, Meyr., Tr. E. Soc. 1886, p. 219, n. sp.
- Anydraula cyanolitha*, Fiji, Meyr., Tr. E. Soc. 1886, p. 220, n. sp.
- Paraponyx chrysota*, Fiji, Meyr., Tr. E. Soc. 1886, p. 221; *P. (?) infirmalis*, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 82, sep. pag. : n. spp.
- Barisoa*, n. g., affinities not stated, for *B. intentalis*, Jamaica, n. sp.; Möschl., Abh. senck. Ges. xiv, p. 83, sep. pag.
- Hydrocampa scitalis*, Bombay, Swinh., P. Z. S. 1885, p. 869; *H. gyralis*, p. 159, *australis*, p. 168, N. America, Hulst, Tr. Am. Ent. Soc. xiii : n. spp.
- Nausinoe*, n. n. for *Phalangiodes*, Guén.; Moore, Lep. Ceyl. iii, p. 309.
- Zebronia graphicalis*, E. India, Swinh., P. Z. S. 1886, p. 459, n. sp.
- Enchocnemidia phryneusalis*, Walk., figured, pl. 182, fig. 12; Moore Lep. Ceyl. iii.
- Cydalima laticostalis*, Guén., figured, pl. 182, fig. 4; Moore, Lep. Ceyl. iii.
- Chabrela*, n. g., type *Zebronia acamasalis*, Walk.; Moore, Lep. Ceyl. iii, p. 317.
- Omphisa*, n. g., p. 317, for *Botys illisalis*, Walk., which is figured pl. 183, fig. 4; Moore, Lep. Ceyl. iii.
- Analles* (sub *Botys*) *idyalis*, Walk., figured; Moore, Lep. Ceyl. iii, p. 319.
- Glyphodes pyloalis*, pl. 180, fig. 3, *actorionalis*, pl. 180, fig. 1, *itysalis*, Walk., pl. 180, fig. 4, *bivitraris*, Guén., pl. 180, fig. 2, figured, Moore, Lep. Ceyl. iii. *G. actorionalis*, Walk., ♂ characters; Meyr., Tr. E. Soc. 1886, p. 224.
- G. fessalis*, E. India, Swinh., P. Z. S. 1886, p. 459, pl. xli, fig. 13; *G. alitalis*, N. America, Hulst, Tr. Am. Ent. Soc. xiii, p. 158 : n. spp.
- Eudiotis oratalis*, Louisiana, Hulst, Tr. Am. Ent. Soc. xiii, p. 158, n. sp.
- Margaronia glauculalis*, Guén., pl. 181, fig. 2, *celsalis* (sub *Botys*), Walk., pl. 181, fig. 4, figured; Moore, Lep. Ceyl. iii.
- M. limbata*, Australia, Butl., Tr. E. Soc. 1886, p. 430, n. sp.
- Nosophora quadrisignata*, Ceylon, Moore, Lep. Ceyl. iii, p. 320, pl. 183, fig. 6, n. sp.
- Cliniodes euphrosinalis*, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 80, sep. pag., n. sp.
- Margarodes lactoides*, Aru Is., Pag., JB. nass. Ver. xxxix, p. 170.; *M. oceanitis*, New Hebrides, &c., Meyr., Tr. E. Soc. 1886, p. 222 : n. spp.
- Cydalima*, Led., characters given; Meyr., Tr. E. Soc. 1886, p. 223.
- C. mysteris*, New Hebrides, Meyr., Tr. E. Soc. 1886, p. 223, n. sp.
- Neurina procopia*, Cr., figured, pl. 182, fig. 1; Moore, Lep. Ceyl. iii.
- Basonga*, n. g., near *Nevrina*, Guén. ?, for *B. paradisalis*, Jamaica, n. sp., pl., fig. 26; Möschl., Abh. senck. Ges. xiv, p. 79, sep. pag.
- Filodes fulvidorsalis*, Hb., figured, pl. 182, fig. 2; Moore, Lep. Ceyl. iii.
- Dodanga*, n. g., p. 331, for *D. lobipennis*, Ceylon, n. sp., pl. 182, fig. 3, p. 332; Moore, Lep. Ceyl. iii.
- Dadessa*, n. g., allied to *Conogethes*, Meyr., for *Botys evaxalis*, Walk., which is figured pl. 183, fig. 3; Moore, Lep. Ceyl.

Pitacanda, n. g., for *P. pilosomoides*, Ceylon, n. sp., p. 334, pl. 183, fig. 10; Moore, Lep. Ceyl. iii.

Botyodes asialis, Guén., figured, pl. 183, fig. 1; Moore, Lep. Ceyl. iii.

Cadarena, n. g., p. 335, for *Phaena sinuata*, Fab., which is figured pl. 183, fig. 2; Moore, Lep. Ceyl. iii.

Trithyris ignefactalis, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 81, sep. pag., sp. n.

Scoptonoma, Zell., referred to *Botydidæ*; Meyr., Tr. E. Soc. 1886, p. 2.

Astura festivalis, Bombay, Swinh., P. Z. S. 1885, p. 872, n. sp.

Botys furnacalis, Gu., referred to *Mecyna* and redescribed; Meyr., Tr. E. Soc. 1886, p. 264. *B. orissusalis*, Walk., referred to *Notarcha*, Meyr., = (*trigalis*, Ld.); Meyr., Tr. E. Soc. 1886, p. 258. *B. asinalis*, cf. *Lissonota nitida* (*Ichneumonides*).

B. epastalis, Bombay, Swinh., P. Z. S. 1885, p. 874, pl. lvii, fig. 13; *B. horatius*, p. 430, *argyrogastrer*, p. 431, Fiji, Butl., Tr. E. Soc. 1886; *B. roseopenmalis*, p. 148, *bellulalis*, *bububattalis*, *psychicalis*, *rogatalis*, *hariolalis*, p. 149, *offumalis*, *lulualis*, *nevalis*, *salutalis*, p. 150, *venalalis*, *pilalis*, *confovealis*, *pergilvalis*, *gracilalis*, p. 151, *hædulalis*, *gyralis*, *invinctalis*, *labeculalis*, *levalis*, p. 152, *octosignalis*, *succandidalis*, *festalis*, *uxorculalis*, *obnigralis*, p. 153, *thrallophilalis*, *monutalis*, *immaculalis*, *fumoferalis*, *oblectalis*, p. 154, *scurralis*, *gulosalis*, p. 155, N. America, Hulst, Tr. Am. Ent. Soc. xiii; *B. aulicalis*, p. 75, sep. pag., *villicalis*, *matronulalis*, *collustralis*, p. 76, *hilaralis*, *meropialis*, p. 77, *janiralis*, p. 78, Jamaica, Möschl., Abh. senck. Ges. xiv, sep. pag.: n. spp.

Genus (?), described, for *Botys octoguttalis*, Feld., which is redescribed; Meyr., Tr. E. Soc. 1886, p. 241.

Berdura, n. g., affinities not stated, for *B. pupillalis*, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 78, sep. pag., n. sp.

Hapalia denticulosa, p. 337, pl. 183, fig. 8, *fraterna*, pl. 183, fig. 9, *marginalis*, pl. 182, fig. 13, p. 338, *concolor*, p. 339, pl. 181, fig. 3, n. spp.

H. jopasalis, Walk., pl. 182, fig. 14, figured; Moore, Lep. Ceyl. iii.

Circobotys octoguttalis, Feld., figured, pl. 182, fig. 11; Moore, Lep. Ceyl. iii.

Lotanga, n. g., for *L. milvinalis*, Ceylon, n. sp., p. 344, pl. 183, fig. 11, and to include *Botys deciusalis*, Walk.; Moore, Lep. Ceyl. iii.

Condega, n. g., p. 344, for *C. obscurata*, Ceylon, n. sp., p. 345, pl. 183, fig. 12; Moore, Lep. Ceyl. iii.

Cometura, n. g. (*Botydidæ*), for *C. picrogramma*, Fiji, n. sp.; Meyr., Tr. E. Soc. 1886, p. 226.

Spanista, Ld., error in definition of, corrected; Meyr., Tr. E. Soc. 1886, p. 227. *S. ornatalis*, Dup., = (*Hydriris chalybitis*, Meyr.); *id. t. c.* p. 226.

Dracænura, n. g. (*Botydidæ*), for *Platamonia stenosoma*, Feld., which is redescribed, p. 227, and *D. pelochra*, p. 228, *asthenota*, Fiji, *agramma*, Samoa, *horochoera*, N. Guinea, p. 229, *myota*, New Hebrides, &c., p. 230, n. spp.; Meyr., Tr. E. Soc. 1886.

Pleonectusa, Ld., characters given, p. 230; *P. (Bradina) metaleucalis*, Walk., described, p. 231; *P. parallela*, Fiji, p. 231, *chloroscia*, Tonga, *trispila*, Fiji, p. 232, *chalinota*, Solomon Is., p. 233, n. spp.; Meyr., Tr. E. Soc. 1886.

Trematarcha, n. g., near *Pleonectusa*, p. 233, for *Marasmia erilitalis*, Feld., which is redescribed, p. 234, and *T. semnopa*, Rotumah I., n. sp., p. 234; Meyr., Tr. E. Soc. 1886.

Marasmia, Ld., characters given; Meyr., Tr. E. Soc. 1886, p. 235. *Botys ruralis*, Walk., = (*M. cicatricosa*, Ld.), and belongs to *Marasmia*; *id. loc. cit.*

Epimima, n. g., p. 235, for *E. stereogona*, Fiji, n. sp., p. 236; Meyr., Tr. E. Soc. 1886.

Dolichosticha perinephes, Fiji, Meyr., Tr. E. Soc. 1886, p. 236, n. sp.

Cnaphalocrocis bifurcalis, Snell., noticed and referred to *Dolichosticha*, Meyr.; Meyr., Tr. E. Soc. 1886, p. 237.

Chaura, Ld., characters given; Meyr., Tr. E. Soc. 1886, p. 237. *C. octavialis*, Ld., = (*Syngamia secutalis*, Walk.); *id. t. c.* p. 238.

Rhimphalea anone, Australia, Butl., Tr. E. Soc. 1886, p. 428, n. sp.

Polythlipta divaricata, Ceylon, Moore, Lep. Ceyl. iii, p. 311, pl. 179, fig. 16, n. sp.

Haritala, n. n. for *Notarcha*, Meyr.; Moore, Lep. Ceyl. iii, p. 311.

H. tigrina, Ceylon, n. sp., Moore, Lep. Ceyl. iii, p. 312, pl. 182, fig. 5.

Aripana, n. n. for *Conchylodes*, Meyr., *nec* Guén.; Moore, Lep. Ceyl. iii, p. 312.

Synclera = (*Notarcha*, Sect. B., Meyr.), p. 315; *S. traducalis*, Z., pl. 182, fig. 9, *cæsalis*, Walk., pl. 183, fig. 7, figured: Moore, Lep. Ceyl. iii.

Synclera prælatalis, Jamaica, Möschl., Abh. senck. Ges. xiv, p. 81, sep. pag., n. sp.

Oangetta, n. g., for *C. rectilinea*, Ceylon, n. sp., pl. 182, fig. 8, Moore, Lep. Ceyl. iii, p. 314.

Deba milvinalis, Bombay, Swinh., P. Z. S. 1885, pl. lvii, fig. 2, n. sp.

Archernis, n. g., next *Semioceros*, for *A. callixantha*, New Guinea, n. sp., Meyr., P. Linn. Soc. N.S.W. (2) i, p. 254.

Nosophora, Led., characters and position of; *N. ochnodes*, New Guinea, n. sp.: Meyr., P. Linn. Soc. N.S.W. (2) i, p. 255.

Conogethes umbrosa, New Guinea, Meyr., P. Linn. Soc. N.S.W. (2) i, p. 256, n. sp.

Nesolocha, n. g., p. 239, for *N. autolitha*, New Guinea, n. sp., p. 240, Meyr., Tr. E. Soc. 1886.

Semioceros allocosma, Fiji, p. 242, *tricrossa*, New Guinea, *dactyloptila*, Fiji, p. 243, Meyr., Tr. E. Soc. 1886, n. spp.

Ptilæola, n. g. for *P. ulophanes*, Fiji, n. sp., Meyr., Tr. E. Soc. 1886, p. 245.

Erebangella, n. g., p. 245, for *E. melanauges*, Fiji, &c., n. sp., p. 246, Meyr., Tr. E. Soc. 1886.

Diplotyla, n. g., p. 246, for *D. ochrosema*, Fiji, &c., p. 247, *cyclospila*, Samoa, *argopis*, Fiji, p. 208, n. spp., and to include *Desmia*, Walk., part, and *Ædiodes orientalis*, Snell.; Meyr., Tr. E. Soc. 1886.

Strepsimela, n. g. for *S. xanthosoma*, Samoa, and *S. (?) microcentra*, Fiji, n. spp.; Meyr., Tr. E. Soc. 1886, p. 249: to include also *Isopteryx signiferalis*, Wallengr.; *id. t. c.* p. 250.

Eurytorna, n. g., p. 251, for *E. heterodoxa*, Fiji, n. sp., p. 252; Meyr., Tr. E. Soc. 1886.

Autharetis, n. g., p. 252, for *A. eridora*, Fiji, n. sp., p. 253; Meyr., Tr. E. Soc. 1886.

Omiodes, Gn., characters given; Meyr., Tr. E. Soc. 1886, p. 254.

O. leucostrepta, Tonga, Fiji, *id. loc. cit.*, n. sp.

Ehulea fimbriata, Ceylon, Moore, Lep. Ceyl. iii, p. 346, n. sp.

Macarettera, n. g. for *M. hesperis*, Fiji, n. sp., Meyr., Tr. E. Soc. 1886, p. 255.

Compsophila, n. g. for *C. iocosma*, Fiji, n. sp., Meyr., Tr. E. Soc. 1886, p. 256.

Physematia, Ld. (?), characters given; Meyr., Tr. E. Soc. 1886, p. 257.

P. epispila, Fiji, Meyr., Tr. E. Soc. 1886, n. sp.

Notarcha erixantha, p. 258, *octasema*, New Hebrides, *halurga*, p. 259, *butyrina*, Fiji, p. 260, Meyr., Tr. E. Soc. 1886, n. spp.

Epichronistis, n. g., p. 260, for *E. acrospila*, Fiji and Mauritius, n. sp.; Meyr., Tr. E. Soc. 1886.

Lygropis, Ld. (?), characters given; Meyr., Tr. E. Soc. 1886, p. 261.

L. sirioxantha, Fiji, Meyr., Tr. E. Soc. 1886, p. 262, n. sp.

Eurycreon rantalis, Guén., ravages, food-plants, habits, &c.; Riley, Rep. 1885, pp. 265-270, pl. vi, fig. 3.

E. lamprodeta, *prionogramma*, New Guinea, Meyr., Tr. E. Soc. 1886, p. 265; *E. aureolalis*, Arizona, Hulst, Tr. Am. Ent. Soc. xiii, p. 156: n. spp.

Eixeristis, n. g., near *Eurycreon*, p. 266, for *E. asyphela*, p. c., Tonga, *xanthota*, without habitat, p. 267, n. spp.; Meyr., Tr. E. Soc. 1886.

Pseudephyra, n. g., near *Homophysa*, for *P. straminea*, Australia, n. sp.; Butl., Tr. E. Soc. 1886, p. 422, pl. x, fig. 10.

Stenurges floridalis, Florida, Hulst, Tr. Am. Ent. Soc. xiii, p. 156, n. sp.

Megastes caligenalis, Florida, Hulst, Tr. Am. Ent. Soc. xiii, p. 156, n. sp.

Orobena reluctalis, p. 156, *subcitrinalis*, *seminivealis*, Arizona, *castanealis*, Texas, p. 157, Hulst, Tr. Am. Ent. Soc. xiii, n. spp.

Paliga, n. g., p. 350, for *Scopula damastesalis*, Walk.; Moore, Lep. Ceyl. iii.

Scopula fotalis, Poona, Swinh., P. Z. S. 1885, pl. lvii, fig. 9; *S. auritincta*, Australia, Butl., Tr. E. Soc. 1886, p. 431: n. spp.

Nymphula sordida, Australia, Butl., Tr. E. Soc. 1886, p. 432, n. sp.

Mecyna deprivalis, Walk., figured, pl. 179, fig. 1; Moore, Lep. Ceyl. iii.

Godara comalis, Guén., figured, pl. 179, fig. 2; Moore, Lep. Ceyl. iii.

Stenopteryx hybridalis var. noticed; Swinh., P. Z. S. 1885, p. 876.

Scoparia zelleri, Wk., variation of; Fuchs, S. E. Z. xlvii, p. 63. *S. mercurella* larva described; Porritt, Ent. M. M. xxii, p. 260. *S. angustea*, Curt., larva described; *id. t. c.* p. 209.

S. ictericalis, Poona, Swinh., P. Z. S. 1885, p. 876, pl. lvii, fig. 16; *S. ninguidalis*, Arizona, p. 147, *nominatilis*, Vancouver I., *refugalis*, California, p. 147, Hulst, Tr. Am. Ent. Soc.: n. spp.

Eudorea ulmella, Dale, *conspicualis*, Hodg., probably identical; Mason, Ent. M. M. xxiii, p. 163. *E. murana* and *mercurella*, cf. *Lissonota rufomedia* (*Ichneumonides*).

Hoploscopa, n. g., between *Scoparia* and *Schænobius*, p. 267, for *H. astrapias*, Fiji, n. sp., p. 268; Meyr., Tr. E. Soc. 1886.

Noorda blitealis, Walk, figured, pl. 178, fig. 11 ; Moore, Lep. Ceyl. iii.
Toripalpus taleolalis, enthealis, olivalis, atrifascialis, N. America, Hulst, Tr. Am. Ent. Soc. xiii, p. 160, n. spp.
Acentropus, trophi of, discussed ; Walter, Jen. Z. Nat. xviii, pp. 766-778.

CRAMBIDÆ.

[*Of*. Butler (95), Costa (132), Haar (265), Hulst (145), Lafaury (385), Meyrick (443), Moore (463), Swinhoe (692, 693), Tutt (707), Weyenbergh (733).]

Melissoblaptes depressellus, Poona, Swinh., P. Z. S. 1885, p. 876, pl. lvii, fig. 5 ; *M. isodesma*, Fiji, Meyr., Tr. E. Soc. 1886, p. 272 : n. spp.

Rhungena, n. g. (*Galleriidae*), p. 375, for *R. roseipennis*, Ceylon, n. sp., p. 376, pl. 184, fig. 12 ; Moore, Lep. Ceyl.

Heteromicta, n. g., p. 273, for *H. trichogramma*, Fiji, n. sp., p. 273 ; Meyr., Tr. E. Soc. 1886 : to include also *pachytera, tripartitella*, Meyr., *latro*, Z., and *Lamoria rufivena*, Walk., = (*Melissoblaptes rufovenalis*, Snell.) ; *id. loc. cit.*

Sorhagen, L., Ragonot's revision of the British species of *Phycitide* and *Galleriide* ; Ent. Nachr. xii, pp. 88-91. A list of the species and synonyms, with explanatory and a few original remarks.

Phycitide, neurulation of discussed ; Butl., Tr. E. Soc. 1886, p. 439.

Salebria formosa, abnormal neurulation ; Stange, S. E. Z. xlvii, p. 282.
Salebria and *Mella*, neurulation noticed ; Butl., Tr. E. Soc. 1886, pp. 439 & 440.

S. squamicornis, Australia, Butl., Tr. E. Soc. 1886, p. 439 ; *S. minutella* (Ragt. MS.), Ceylon, Moore, Lep. Ceyl. iii, p. 361 : n. spp.

Mella arenosa, Australia, Butl., Tr. E. Soc. 1886, p. 440, n. sp.

Anerastia nitens, Australia, Butl., Tr. E. Soc. 1886, p. 440 ; *A. excanthalis*, p. 163, *cestalis, dotalis*, p. 164, N. America, Hulst, Tr. Am. Ent. Soc. xiii : n. spp.

Phycis carbonariella, habits ; Barrett, Ent. M. M. xxiii, p. 108.

Magiria robusta, Ceylon, p. 365, pl. 184, fig. 4, Moore, Lep. Ceyl. iii, n. sp.

Epicrosis festivella, Z., figured, pl. 184, fig. 8 ; Moore, Lep. Ceyl. iii.

Cabragus, n. g., p. 370, for *C. auritipalpus*, Ceylon, n. sp., p. 371, pl. 184, fig. 9 ; Moore, Lep. Ceyl. iii.

Moca lithosioides, Ceylon, p. 372, Moore, Lep. Ceyl. iii, n. sp.

Zophodiopsis hyenella, Fromh., note on ; B. E. Z. xxx, p. 138.

Nephoptyx mathematicella Cordova ; Weyenb., Tijdschr. Ent. xxix, p. 123, pl. iv, figs. 9-12 : note by Snellen, p. 124, who thinks it may be a *Ceratophora*.

N. suffuscalis, E. India, Swinh., P. Z. S. 1886, p. 460 ; *N. lentalis*, pl. lvii, fig. 18, *laxalis, creperalis*, fig. 20, E. India, *id. op. cit.*, 1885, p. 877 : *N. actualis, delussalis, perfuscalis, lallotalis*, p. 161, *pergratialis, uncanalis*, p. 162, N. America, Hulst, Tr. Am. Ent. Soc. xiii, p. 162 : n. spp.

Pempelia lacteomarginata, Sardinia, Costa, Rend. Acc. Nap. xxv, p. 53 ; *P. tarmitalis*, Colorado, Hulst, Tr. Am. Ent. Soc. xiii, p. 162 : n. spp.

Pinipestis fasciolalis, N. America, Hulst, Tr. Am. Ent. Soc. xiii, p. 162, n. sp.

Homæosoma senecionis, larva described; Porritt, Ent. xix, p. 211.

H. derasella, Bombay, Swinh., P. Z. S. 1885, p. 877, pl. lvii, fig. 19; *H. cataphæa*, Fiji, Meyr., Tr. E. Soc. 1886, p. 272; *H. impressalis*, N. America, Hulst, Tr. Am. Ent. Soc. xiii, p. 163: n. spp.

Megaphycis fernaldialis, *edwardsialis*, N. America, Hulst, Tr. Am. Ent. Soc. xiii, p. 163, n. spp.

Ephestia kuhniella, influence of different foods on; OB. Ver. Rheinl. xliii, p. 57.

E. albocostalis (cf. *errata*, t. c.), California, Hulst, Tr. Am. Ent. Soc. xiii, p. 164, n. sp.

Nyctegretis achatinella, Hbn., habits and metamorphoses; Graaf, Tijdschr. Ent. xxix, pp. 236-238, pl. ix, figs. 3-9.

Conobathra, n. g. for *C. automorpha*, New Guinea, n. sp., Meyr., Tr. E. Soc. 1886, p. 271.

Calamotropha dielota, Fiji, Meyr., Tr. E. Soc. 1886, p. 268, n. sp.

Autarotis, n. g., p. 269, for *A. euryala*, Fiji, n. sp., p. 270, Meyr., Tr. E. Soc. 1886.

Hednota, n. g., to include all the Australian species of *Thinasotia*, Meyr., except *lativittalis*, Walk.; Meyr., Tr. E. Soc. 1886, p. 270.

Eucarpia (*Hypochalcia*) *tritralis*, Walk., = (*Crambus vetustellus*, id., = *E. vulgatella* and *cnephuella*, Meyr.); Meyr., P. Linn. Soc. N.S.W. (2) i, p. 804.

Epicrocis (*Nephopteryx*) *patulalis*, Walk., = (*Pempelia ruftinctella*, Meyr.); *E. (Trachonitis) oppositalis*, Walk., = (*Pempelia caliginosella*, Meyr.); *E. (T.) sublignalis*, Walk., = (*P. strigiferella*, Meyr.): Meyr., P. Linn. Soc. N.S.W. (2) i, p. 804.

Crocodypora (*Nephopteryx*) *cinigerella*, Walk., = (*N. stenopterella*, Meyr.); Meyr., P. Linn. Soc. N.S.W. (2) i, p. 804.

Eromene transcissella, Walk., cf. *Arotrophora arcuatalis*, Tortricidæ.

Diptychophora (*Cataclysta*) *ochracealis*, Walk., = (*Eromene præmaturella* and *dilatella*, Meyr.); Meyr., P. Linn. Soc. N.S.W. (2) i, p. 804.

Diptychophora inornata, Australia, Butl., Tr. E. Soc. 1886, p. 440, n. sp.

Thinasotia: all the Australian species of, except *lativittalis*, Walk., and *torrentella*, Meyr., are to be referred to *Hednota*, Meyr.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 804.

Crambus cuneiferellus, Walk., = (*microphacellus*, Walk.); Meyr., P. Linn. Soc. N.S.W. (2) i, p. 803. *C. vicens*, Butl., = (*fucatellus*, Christ.); Baker, Ent. M. M. xxii, p. 238. *O. porcellanellus*, Motsch., redescribed; id. t. c. p. 239. *C. margaritellus* var. noticed; Stange, S. E. Z. xlvii, p. 282. *C. hapaliscus*, Z., figured, pl. 184, fig. 6; Moore, Lep. Ceyl. iii. *O. contaminellus* noticed; Ent. xix, pp. 26, 73: larva described; t. c. p. 130: nomenclature of; t. c. p. 131; also cf. *Ichneumonides*, *Lissonota rufomedia* and *lineata*. *C. perlillus*, larva described; Porritt, Ent. M. M. xxiii, p. 7. *C. inquinatellus*, metamorphoses; Laf., Ann. Soc. Ent. Fr. (6) v, p. 397. *O. humerellus* and *submarginellus*, Walk., cf. *Tortrix*.

C. cantiellus, S. England, Tutt, Ent. xix, p. 52, n. sp.: noticed by Tugwell, t. c. pp. 75 & 163; *C. multivagellus*, E. India, Swinh., P. Z. S. 1886,

p. 462 ; *C. partellus*, Poona, *id. op. cit.* 1885, p. 879 ; *C. ermineus*, Ceylon, Moore, Lep. Ceyl. iii, p. 380, pl. 184, fig. 7 ; *C. extorralis*, *trichusalis*, *cypridalis*, *delectatis*, p. 165, *offectalis*, *cuneolalis*, *refotalis*, *biothanatalis*, p. 166, *bonusculalis*, *gausapalis*, *comptulatalis*, p. 167, N. America, Hulst, Tr. Am. Ent. Soc. xiii : n. spp.

Calamotropha (sub *Crambus*) *delatalis*, Walk., = (*Chilo leptogrammelus*, Meyr.) ; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 803.

Hypotia allalis, E. India, Swinh., P. Z. S. 1886, p. 462, pl. xli, fig. 2, n. sp.

Epischmia boisduvaliella, Gn., metamorphoses ; Laf., Ann. Soc. Ent. Fr. (6) v, p. 398.

Acrobasis fallonella, Rag., metamorphoses ; Laf., Ann. Soc. Ent. Fr. (6) v, p. 400.

Heterographis lafauryella, Rag., metamorphoses ; Laf., Ann. Soc. Ent. Fr. (6) v, p. 401.

Libuna, n. n. for *Bulina*, Walk. ; Moore, Lep. Ceyl. iii, p. 379.

Ancylolomia taprobanensis, Z., figured, pl. 184, fig. 2 ; *A. argentata*, pl. 184, fig. 3, *basistriga*, pl. 184, fig. 1, Ceylon, p. 382, n. spp. ; Moore, Lep. Ceyl. iii.

Culladia, n. n. for *Araxes*, Walk. *nec* Stph. ; Moore, Lep. Ceyl. iii, p. 382.

Chilo desistalis, Walk., figured, pl. 184, fig. 10 ; Moore, Lep. Ceyl. iii.

C. ortellus, E. India, Swinh., P. Z. S. 1886, p. 461, pl. xli, fig. 3, n. sp.

Schaenobius bipunctifera, Walk., figured, pl. 184, fig. 13 ; Moore, Lep. Ceyl. iii.

S. bisignatus (Zell. MS.), Poona, Swinh., P. Z. S. 1885, p. 878 ; *S. palescalis*, Arizona, Hulst, Tr. Am. Ent. Soc. xiii, p. 167 : n. spp.

Charltona, n. g. (without indicated affinities, placed by author between *Catagella* and *Eromene*), p. 878, for *C. kala*, E. India, n. sp., p. 879, pl. lvii, fig. 4 ; Swinh., P. Z. S. 1885.

Jartheza obstitella, Poona, Swinh., P. Z. S. 1885, p. 880, pl. lvii, fig. 3 ; *J. cassimella*, E. India, *id. op. cit.* 1886, p. 461, pl. xli, fig. 4 : n. spp.

Metasia olbienalis, Gn., sexes figured, metamorphoses noticed, n. var. *ægitnalis* described ; Mill., Ann. Soc. Ent. Fr. (6) vi, pp. 9 & 10, pl. i, figs. 11 & 12.

M. candidulalis, Poona, Swinh., P. Z. S. 1885, p. 880, pl. lvii, fig. 6, n. sp.

Pelena, n. g. for *P. unicolor*, Ceylon, n. sp., pl. 184, fig. 16 ; Moore, Lep. Ceyl. iii, p. 386.

Panalipa, n. g. for *Araxes*, sect. 3, Walk. ; Moore, Lep. Ceyl. iii, p. 386.

Apurima costalis, Ceylon, p. 388, pl. 184, fig. 15, n. sp. ; *A. xanthogastrella*, Walk., figured, pl. 184, fig. 14 ; Moore, Lep. Ceyl. iii.

Patissa, n. g., p. 388, for *Metasia lactealis*, Feld., which is figured, pl. 184, fig. 11 ; Moore, Lep. Ceyl. iii.

Ramila acciusalis, Walk., figured, pl. 184, fig. 5 ; Moore, Lep. Ceyl. iii.

TORTRICIDÆ.

[Cf. Barrett (30), Butler (92), Haar (265), Koch (357), Lafaury (385), Meyrick (443), Poulton (560), Riley (608), Stange (679), Swinhoe & Walsingham (692, 693).]

Teras viburnana, Clem., noticed; Riley, Rep. Ent. 1885, p. 332.

T. variana, N. America, Fernald, in Bull. Dep. Agric. Ent. No. 12, pp. 17-20, n. sp.

Tortrix viridana, St., ravages of; Orm., Rep. ix, pp. 59-61. *T. dumentana*, Tr., metamorphoses; Laf., Ann. Soc. Ent. Fr. (6) v, p. 403. *T. unifasciana*, Dup., habits and metamorphoses; Graaf, Tijdschr. Ent. xxix, p. 238. *T. murinana*, Hb.: *Nemorilla maculosa*, Meig., is a parasite of; Wien. ent. Z. v, p. 307. *T. (Goboea) coposiana*, Walk., = (*T. ceramicana*, Meyr.), *T. (Crambus) humerellus*, Walk., = (*T. centurionana*, Meyr.); Meyr., P. Linn. Soc. N.S.W. (2) i, p. 805. *T. ambiguella*, Koch (357).

T. packardiana, N. America, Fernald, in Bull. Dep. Agric. Ent. No. 12, p. 20, n. sp.

Cacacia argyrosipila, Walk., habits and metamorphoses; Riley, Rep. 1885, pp. 329 & 330. *C. micaceana* noticed; Walsingm., P. Z. S. 1885, p. 881.

Conchylis dipoltella, *hindermanniana*, *mussehlana*, habits of larvæ; Stange, S. E. Z. xlvii, p. 282. *C. sparsana*, Walk., cf. *Comarchis, Lithosiidæ*.

Penthina achatana, F., metamorphoses; Laf., Am. Soc. Ent. Fr. (6) v, p. 404.

Eccopsis latifasciana, Hw., metamorphoses; Laf., Ann. Soc. Ent. Fr. (6) v, p. 407. *E. permundana* and *versicolorana*, Clem., habits and metamorphoses; Packd, in Riley Rep. 1885, pp. 330 & 331.

E. aprobola, Tonga, Meyr., Tr. E. Soc. 1886, p. 275, n. sp.

Retinia pinivorana: *Limneria ramidula* was bred from this; Bridgm., Tr. E. Soc. 1886, p. 351.

Antithesia carbonana, Dbl., Britain, Barrett, Ent. M. M. xxiii, p. 4, n. sp.

Sericoris metallicana, Hb., var. = (*alternana*, Curt.; Barrett, Ent. M. M. xxiii, p. 3.

S. dissolutana (Z.i.l.), N. Germany, Stange, S. E. Z. xlvii, p. 282, n. sp.

Pædisca bilunaria larva described; Balding, Ent. M. M. xxiii, p. 67.

P. solandriana: *Ichneumon majus* reared from; Bridgm., Tr. E. Soc. 1886, p. 336.

Eudemis helichrysa, Rag., metamorphoses; Laf., Ann. Soc. Ent. Fr. (6) v, p. 405.

Grapholitha prunivorana, Rag., and *littorana*, Const., metamorphoses; Ann. Soc. Ent. Fr. (6) v, pp. 407-409. *G. penkleriana*, larva and habits; Balding, Ent. M. M. xxii, p. 235.

Carpocapsa immanis, Fiji, Meyr., Tr. E. Soc. 1886, p. 276, n. sp.

Adoxophyes cyrtosema, Tonga & Fiji, Meyr., Tr. E. Soc. 1886, p. 276, n. sp.

Dicrorhampha plumbana, allies and their synonymy discussed ; Barrett, Ent. M. M. xxiii, p. 1. *D. distinctana*, note on larva ; Ent. xix, p. 232 : on specific value, *t. c.* p. 296-298.

Phthoroblastes trauniana and *regiana*, habits of larvæ, &c. ; Hoffmann, S. E. Z. xlvii, p. 303.

Amorbia humerosana, Clem., noticed ; Riley, Rep. 1885, p. 329.

Cerace tetraonis, India, Butl., P. Z. S. 1886, p. 394, n. sp.

Orosana desumptana, Walk., cf. *Hypertrophæa*, *Tineidæ*.

Oistophora (*Enopa*) *mediella*, Walk., = (*O. pterocosmana*, Meyr. ; Meyr., P. Linn. Soc. N. S. W. (2) i, p. 805.

Arotrophora arcuatalis, Walk., Meyr., = (*Crambus submarginellus*, Walk., and *Erömene transcissella*, *id.*) ; Meyr., P. Linn. Soc. N. S. W. (2) i, p. 805.

TINEIDÆ.

[Cf. Brown (87), Frey (216), Fuchs (219), Haar (265), Lafaury (385), Meyrick (437, 438, 440, 443), Millière (451, 453), Pagenstecher (518), Riley (606), Schmid (636), Swinhoe & Walsingham (692, 693), Teich (695).]

Lita, *Psilothrix*, *Liodes*, *Mniophila* : these names to be changed, being preoccupied in *Coleoptera* ; Goz., Recherche, p. 26.

Sesiomorpha abnormis, Snell., or n. sp. ?, described at length ; Pag., JB. nass. Ver. xxxix, p. 180.

Alavona barbarella and *cossinella*, Walk., noticed ; Walsingm., P. Z. S. 1885, p. 882.

A. minor, Walsingm., P. Z. S. 1886, p. 464, pl. xli, figs. 10 & 11, n. sp.

Psilothrix incerta, Lombardy, Mill., Bull. Soc. Ent. Fr. (6) vi, p. liv, and Nat. Sicil. vi, p. 3, pl. i, figs. 5 & 6, n. sp.

Tinea fuliginosella, Z., p. 409, *flavescentella*, Hw., p. 410, metamorphoses ; Laf., Ann. Soc. Ent. Fr. (6) v. *T. parietariella*, life-history ; Chrétien, Feuille. Nat. xvi, pp. 65-69. *T. pelliella* and *Tineola biselliella*, trophi of ; Walter, Jen. Z. Nat. xviii, pp. 762-764.

T. turatiella, Genoa, Mill., Ann. Soc. Ent. Fr. (6) vi, p. 9, pl. i, fig. 10 ; *T. sacerdos*, Bombay, Walsingm., P. Z. S. 1885, p. 882 ; *T. subochraceella*, E. India, *id. op. cit.* 1886, p. 464, pl. xli, fig. 9 : n. spp.

Drosica ? *deviella*, Walk., referred to gen. *Hapsifera*, Zell. ; Walsingm., P. Z. S. 1885, p. 883.

Chrysoryctis, n. g. for *Tinea fraudulens*, Ros., *Ecophora irruptella*, Walk., and *Incurvata purella*, Walk. ; Meyr., Ann. N. H. (5) xvii, p. 530.

Anastathma, n. g. *Tineidæ*, for *A. callichrysa*, Fiji, n. sp. ; Meyr., Tr. E. Soc. 1886, p. 290.

Micropterygidæ, characters and wing-neuration of ; Meyr., Tr. N. Z. Inst. xviii, p. 179 : trophi of ; Walter, Jen. Z. Nat. xviii, pp. 755-762 : phylogenetic note on ; Meyr., Tr. N. Z. Inst. xviii, p. 179.

Mnesarchæa, n. g. (*Micropterygidæ*), for *M. paracosma*, N. Zealand, n. sp. ; Meyr., Tr. N. Z. Inst. xviii, p. 180.

Paleomicra, n. g., p. 180 (*Micropterygidæ*) the neuration practically identical with that of some *Trichoptera*, for *P. chalcophanes*, *chrysargyra*, New Zealand, n. spp., p. 182 ; Meyr., Tr. N. Z. Inst.

Micropteryx berytella, Beyrouth, Joan., Bull. Soc. Ent. Fr. (6) vi, p. clxxxiii, n. sp.

Incurvaria mespilella, Bordeaux, Brown, Act. Soc. L. Bord. xxxix, p. xxxix, n. sp.; also noticed, *op. cit.* xl, p. xxxix.

Nemotois sparsellus, Walk., = (*Adela chrysolamprella*, Ros., and *A. laurella*, Newm.); Meyr., Ann. N. H. (5) xvii, p. 530. *N. metallicus*, sexual structures; J. R. Micr. Soc. (2) vi, pp. 61 & 62.

Bondia nigella, Newm., neuration noticed; Meyr., Ann. N. H. (5) xvii, p. 529.

Enæmia, Z., characters, position, synonymy noticed; *E. pyrilampis*, N. Guinea, n. sp.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 257.

Gen. —?, near *Enæmia phlogopa*, New Guinea, n. sp.; Meyr., P. Linn. Soc. N.S.W. (2) i, p. 258.

Cerostoma rugosella, Staint., and *Morphaga? barbarata*, Christoph., are one genus, possibly new; Walsingm., P. Z. S. 1885, p. 883.

Cyathaula, n. g. *Hyponomeutidæ*, for *C. maculata*, Tonga and Fiji, n. sp.; Meyr., Tr. E. Soc. 1886, p. 289.

Decadarchis, n. g. *Erechthiidae*, p. 290, for *D. melanastra*, Fiji, n. sp., p. 291; Meyr., Tr. E. Soc. 1886.

Phthinocola, n. g. *Erechthiidae*, for *P. dochmia*, Tonga, n. sp.; Meyr., Tr. E. Soc. 1886, p. 291.

Chelaria indica, Bombay, Walsingm., P. Z. S. 1885, p. 884, n. sp.

Setomorpha tineoides, Centr. India, Walsingm., P. Z. S. 1886, p. 465, pl. xli, fig. 8, n. sp.

Protosynæma, n. g., p. 173 (*Plutellidæ*), for *P. eratopis*, *steropucha*, New Zealand, n. spp., p. 174; Meyr., Tr. N. Z. Inst. xviii.

Orthenches, n. g., p. 175 (*Plutellidæ*) for *O. chlorocoma*, p. 175, *prasinodes*, *porphyritis*, p. 176, New Zealand, n. spp.; Meyr., Tr. N. Z. Inst. xviii.

Plutella sera, p. 178, *psammochroa*, p. 179, New Zealand, Meyr., Tr. N. Z. Inst. xviii, n. spp.

Trachycentra, n. g. *Plutellidæ*, for *T. calamias*, Tonga and Fiji, n. sp.; Meyr., Tr. E. Soc. 1886, p. 288.

Diurnea fagella melanism in; Porritt, Ent. M. M. xxiii, p. 41.

Depressaria badiella, Hb., metamorphoses; Laf., Ann. Soc. Ent. Fr. (6) v, p. 411. *D. nervosa* injurious to *Carum carui*; habits of pupa; B. E. Z. xxx, p. xxix. *D. swinhoei*, Butl., generic position queried; Walsingm., P. Z. S. 1885, p. 884.

D. anthriscella, Bordeaux, Brown, Act. Soc. L. Bord. xl, p. liii, n. sp.

Octasphales, n. g., p. 283, for *O. charitopa*, New Guinea, n. sp., p. 284; Meyr., Tr. E. Soc. 1886.

Aplota palpella, Hw., metamorphoses; Laf., Ann. Soc. Ent. Fr. (6) v, p. 412.

Phaosaces, n. g., p. 171 (*Depressuriidae*), for *P. compsotypa*, *apocrypta*, New Zealand, n. spp., p. 172; Meyr., Tr. N. Z. Inst. xviii.

Cryptolechiidae, definition of group extended; Meyr., Tr. E. Soc. 1886, p. 281: alteration of the name advisable; Walsingm., P. Z. S. 1885, p. 884.

Cryptolechia hospita, Feld., ♀ described, referred with doubt to *Anteo-tricha*, Z.; Meyr., Tr. E. Soc. 1886, pp. 282 & 283.

C. bicolorella, Aru Is., Pag., JB. nass. Ver. xxxix, p. 182, n. sp.

Tortricomorpha viola, Aru Is., Pag., JB. nass. Ver. xxxix, p. 182, n. sp.

Copromorpha, n. g., p. 281, for *C. gypsota*, Fiji, n. sp., p. 282; Meyr., Tr. E. Soc. 1886.

Gelechia (*Nannodia*) *eppelsheimii*, *naeviferella*, and *stipella* noticed; Staint., Ent. M. M. xxiii, p. 101. *G. vilella*, probable food of larva; *op. cit.* xxii, p. 238: larva described; Warren, *op. cit.* xxiii, p. 89. *G. longicornis*, food-plant; *t. c.* p. 109. *G. obliquistrigella*, metamorphoses and habits; Packard, Bull. Dep. Agric. Ent. No. 12, pp. 20 & 21, pl. i, fig. 2. *G. alternatella*, Walk., p. 812, and *constrictella*, Walk., p. 818, referred to *Macrobatthra*, and redescribed; Meyr., P. Linn. Soc. N.S.W. x, p. 823. *G. notatella*, cf. *Limneria variabilis* (*Ichneumonides*).

G. bergiella, *distinctella* var. *tenebrösella* (n. sp.?), Livonia, Teich, S. E. Z. xlvii, p. 170; *G. umbripennis*, Bombay, Walsingm., P. Z. S. 1885, p. 884; *G. thyraula*, p. 167, *brontophora*, *schematica*, *parapleura*, p. 168, *pharetria*, *monophragma*, p. 169, *lithodes*, *achyrotella*, p. 170, New Zealand, Meyr., Tr. N. Z. Inst. xviii, p. 170; *G. caryaevorella*, N. America, Packd., Riley, Rep. 1885, p. 331: n. spp.

Megacraspedus calamogonus, New Zealand, Meyr., Tr. N. Z. Inst. xviii, p. 163, n. sp.

Isochasta, n. g. (*Gelechiadæ*), for *I. paradesma*, New Zealand, n. sp.; Meyr., Tr. N. Z. Inst. xviii, p. 163.

Thiotricha, n. g. (*Gelechiadæ*), for *T. tetraphala*, *thorybodes*, New Zealand, n. spp.; Meyr., Tr. N. Z. Inst. xviii, p. 164.

Scieropepla, n. g. (*Gelechiadæ*), for *S. typhicola*, New Zealand, n. sp.; Meyr., Tr. N. Z. Inst. xviii, p. 165.

Crocantbes, n. g. (*Gelechiadæ*), p. 277, for *C. prasinopis*, p. c., *heliarcha*, p. 278, New Guinea, n. spp.; Meyr., Tr. E. Soc. 1886.

Brachyaema, n. g. (*Gelechiadæ*), p. 278, for *B. epiochra*, Fiji, n. sp., p. 279; Meyr., Tr. E. Soc. 1886.

Atasthalistis, n. g. (*Gelechiadæ*), p. 279, for *A. pyrocossa*, New Guinea, n. sp., p. 280; to include also *Ypsolophus tricolor*, Feld., and ? *Ethmia gnophrina*, Feld.; Meyr., Tr. E. Soc. 1886.

Autosticta, n. n. for *Automola*, Meyr., nec Loew.; *A. demias*, Fiji, n. sp.; Meyr., Tr. E. Soc. 1886, p. 281.

Anisoplaca, n. g. (*Gelechiadæ*), for *A. ptyoptera*, New Zealand, n. sp.; Meyr., Tr. N. Z. Inst. xviii, p. 171.

Amblypalpis, n. g. near *Æcoecis*, for *A. olivierella*, n. sp., Algeria (larva in galls on *Tamarix*); Rag., Bull. Soc. Ent. Fr. (6) v, pp. ccviii & ccix.

Ceratophora?, vide *Nephoteryx mathematicella*, *Crambidae*.

Lita proclivella, Rhineland, Fuchs, S. E. Z. xlvii, p. 68; *L. luridella*, Livonia, Teich, S. E. Z. xlvii, p. 170; n. spp.

Teleia duponcheliiella, Bordeaux, Brown, Act. Soc. L. Bord. xl, p. liii, n. sp. (*scriptellæ* pars olim.).

Antidica (*Latometus*) *pilipes*, Butl., = (*erimorpha*, Meyr.); Meyr., P. Linn. Soc. N.S.W. (2) i, p. 805.

Plucocosma (*Æcophora*) *resumptella*, Walk., = (*hephaestea*, Meyr.); Meyr., P. Linn. Soc. N.S.W. (2) i, p. 805.

Palparia theophila, *mesophthora*, Tasmania, p. 825, *hesychæa*, p. 826, *lithocosma*, p. 827, Australia, Meyr., P. Linn. Soc. N.S.W. x, n. spp.

Enchocrates picrophylla, Australia, p. 827, Meyr., P. Linn. Soc. N.S.W. x, n. sp.

Eochroa, Meyr., altered to *Eochrois*; *E. tritozantha*, Tasmania, n. sp.; Meyr., P. Linn. Soc. N.S.W. x, p. 828.

Zonopetala synarthra, Australia, *erythrosema*, Tasmania, Meyr., P. Linn. Soc. N.S.W. x, p. 829, n. spp.

Heliocausta atæcha, p. 830, *eudoxa*, p. 831, *epidesma*, p. 832, Meyr., P. Linn. Soc. N.S.W. x, n. spp.

Haplodyta, Meyr., characters of, p. 765; *H. thoracta*, p. 765, *iocalca*, Australia and Tasmania, *heteropta*, Australia, p. 766, n. spp.; Meyr., P. Linn. Soc. N.S.W. x.

Machæritis, Meyr., full characters of, p. 766; *M. calligenes*, Australia and Tasmania, p. 768, *grammophora*, *heniocha*, p. 769, *melanospora*, Australia, *samphora*, Australia and Tasmania, p. 770, *psathyra*, Tasmania, *hemera*, p. 771, *indocta*, Australia, *ægrella*, Australia and Tasmania, p. 772, n. spp.; Meyr., P. Linn. Soc. N.S.W. x.

Leptocroca, Meyr., characters given; *L. sanguinobuta*, Australia, n. sp.; Meyr., P. Linn. Soc. N.S.W. p. 775.

Ecophora aspectatella, Walk., cf. *Comarchis*, *Lithosiidæ*.

Æ. hemisphærica, Australia, *anthemodes*, Australia and Tasmania, p. 780, *ochroma*, *uniformis*, p. 781, *hypochulca*, p. 782, *lagara*, Australia, *eremæa*, p. 783, Australia and Tasmania, *zophodes*, *nubifera*, p. 784, Australia, *lymphatica*, Australia and Tasmania, p. 785, *epimicta*, Tasmania, *sulfurea*, Australia, p. 786, *lychnosema*, Australia and Tasmania, *polio-crana*, Australia, p. 787, *eurrhoa*, Australia and Tasmania, p. 788, *maranta*, New Zealand, p. 791, Meyr., P. Linn. Soc. N.S.W. x, n. spp.

Cremnogenes epichalca, New Zealand, Meyr., P. Linn. Soc. N.S.W. x, p. 793, n. sp.

Crossophora, Meyr., characters given, p. 793, *C. phthorodoxa*, p. 794, *niphadia*, *asyneta*, p. 795, *thetias*, *ænopa*, p. 796, *semiota*, p. 797, Australia, n. spp.; Meyr., P. Linn. Soc. N.S.W. x.

Ochlogenes, Meyr., characters of; *Gelechia advectella*, Walk., referred to it and described; Meyr., P. Linn. Soc. N.S.W. x, p. 797.

Disselia, Meyr., characters of, p. 798; *D. aleurota*, Australia and Tasmania, n. sp., p. 799; Meyr., P. Linn. Soc. N.S.W. x.

Macrobathra, Meyr., characters of given, p. 799; *M. hamaxitodes*, p. 802, *monostadia*, *euryxanthia*, p. 803, Australia, *chrysotoxa*, Australia and Tasmania, *mesopora*, Australia, p. 804, *anemarchia*, p. 805, *heminephela*, Tasmania, *desmotoma*, p. 806, *melanomitra*, p. 807, *trithyra*, *eury-leuca*, p. 808, *melanota*, p. 809, *chlorosoma*, *niphadobola*, p. 810, *argonota*, p. 811, *xuthocoma*, *leucopeda*, p. 813, *rhodospila*, p. 814, Australia, *synastra*, Tasmania, p. 815, *crymalea*, p. 816, *hemitropa*, *melanargyra*, p. 817, Australia, *ceramnobola*, Australia and Tasmania, p. 818, *anemodes*, p. 819, *porphyrea*, Australia, *nephelomorpha*, Australia and Tasmania, p. 820, *brontodes*, p. 821, *myriophthalma*, *chrysospila*, p. 822, Australia, n. spp.; Meyr., P. Linn. Soc. N.S.W. x.

Satrapia, Meyr., characters given, with *S. thesaurina*, Australia, n. sp.; Meyr., P. Linn. Soc. N.S.W. x, p. 823.

Peltophora atricollis, Meyr., = (*Eulechria leucopsina*, Ros.); Meyr., Ann. N. H. (5) xvii, p. 530.

Coesyra annularis, Meyr., = (*Philobotica athletica*, Ros.); Meyr., Ann. N. H. (5) xvii, p. 530.

Butalis fusco-cuprea, habits, &c.: Sang., Ent. M. M. xxii, p. 239. *B. cistorum*, Mill., and *siccella*, Z., metamorphoses of; Laf., Ann. Soc. Ent. Fr. (6) vi, pp. 419 & 420.

B. flavilaterella, Rhineland, Fuchs, S. E. Z. xlvii, p. 71, n. sp.

Hypertrophia (Heliodes) tortriciformis, Gn., = (*Orosana desumptana*, Walk.), and *Anthechia divitiosa*, Walk., = (*H. thesaurella*, Meyr.); Meyr., P. Linn. Soc. N.S.W. (2) i, p. 806.

Thylacopleura, n. g. (*Glyphipterygidae*), p. 284, for *T. autodoxa*, Fiji, n. sp., p. 285; Meyr., Tr. E. Soc. 1886.

Hilarographa, Z., characters given; Meyr., Tr. E. Soc. 1886, p. 286.

H. zapyra, New Guinea, Meyr., Tr. E. Soc. 1886, p. 286, n. sp.

Simaethis sessilis, New Guinea, Pag., JB. nass. Ver. xxxix, p. 179; *S. chalcotoxa*, Tonga and Fiji, *orthogona*, New Guinea, Meyr., Tr. E. Soc. 1886, p. 287: n. spp.

Phycodes hirudinicornis, Gn., = (*Tegna hyblaella*, Walk.); metamorphoses, &c., noticed; Walsingm., P. Z. S. 1885, p. 881.

Argyresthia dilectella, habits of larva; Stange, S. E. Z. xlvii, p. 284.

Zelleria hepariella, habits of larva; Elisha, Ent. M. M. xxiii, p. 88; Staint., t. c. p. 89.

Gracilaria fribergensis, metamorphoses; Fuchs, S. E. Z. xlvii, p. 80. *G. purpuriella*, Chamb.; habits and metamorphoses; Riley, Rep. 1885, p. 332.

Conopomorpha, n. g. (*Gracilariadæ*), for *C. cyanospila*, New Zealand, n. sp.; Meyr., Tr. N. Z. Inst. xviii, p. 183.

Timodora, n. g. (*Gracilariadæ*), p. 295, for *T. chrysochoa* (sic), Tonga, n. sp., p. 296; Meyr., Tr. E. Soc. 1886.

Coleophora, larval longevity of; Murtfeldt, Ent. Am. i, pp. 222-225. *C. niveicostella*, Z., p. 413, *albicostella*, Dup., p. 414, *squamella*, Const., p. 415, *ononidella*, Mill., p. 416, and *settari*, Wocke, p. 417, metamorphoses; Laf., Ann. Soc. Ent. Fr. (6) v. *C. salicorniæ*, *absynthii*, *apicella*, habits of larvæ; Stange, S. E. Z. xlvii, pp. 284 & 285. *C. partitella*, case described; Fuchs, t. c. p. 73. *C. succursella* noticed; *id.* t. c. p. 77. *C. laricella* injurious to *Larix europæa*; Hagen, Canad. Ent. xviii, p. 125. *C. nigricella*, Steph., injurious to cherries; Ent. Nachr. xii, p. 220.

C. bornicensis, p. 73, *agricolella*, p. 78, Rhineland, Fuchs, S. E. Z. xlvii; *C. frankii*, Regensburg, Schmid, CB. Ver. Regensb. xl, p. 160; *C. amethystinella*, Cannes, Rag., Bull. Soc. Ent. Fr. (6) v, p. clxxxi: n. spp.

Cosmopteryx scribaella and *lienigiella* larvæ noticed; Hering, Ent. M. M. xxiii, p. 14.

Chauliodus insecurellus, Stt., metamorphoses; Laf., Ann. Soc. Ent. Fr. (6) v, p. 418.

Schreckensteina (Chrysocoris), position discussed; Meyr., Tr. E. Soc. 1886, p. 2.

- Antispila pfeifferella*, note on ; Ent. M. M. xxiii, p. 13.
- Elachista holdenella*, note on larva of ; Schmid, CB. Vers. Regensb. xl, p. 176. *E. pullella*, F. R., *gregsoni*, Sta., and *aridella*, Hein., united, and *incertella*, Frey, queried ; Frey, MT. schw. ent. Ges. vii, p. 260.
- E. longipennis*, p. 259, *exiguella*, p. 260, *spectrella*, p. 261, Switzerland, Frey, MT. schw. ent. Ges. vii, n. spp.
- Echinoscelis*, n. g. (*Elachistidæ*), for *E. hemithia*, Tonga, n. sp., Meyr., Tr. E. Soc. 1886, p. 293.
- Proterocosma*, n. g. (*Elachistidæ*), p. 293, for *P. triplanetis*, Tonga, *epizona*, Fiji, p. 293, *ochronota*, Tonga, *chionopsamma*, New Guinea, p. 294 ; Meyr., Tr. E. Soc. 1886.
- Persicoptilia*, n. g. (*Elachistidæ*), for *P. erythrota*, New Hebrides, n. sp., Meyr., Tr. E. Soc. 1886, p. 295.
- Lithocolletis sorbi*, habits noticed ; Sang, Ent. M. M. xxii, p. 262.
- Tischeria*, the species double-brooded ; Fuchs, S. E. Z. xlvii, p. 82.
- Cemistoma lotella*, habits of larva ; Stange, S. E. Z. xlvii, p. 285.
- Nepticula argyropeza* and *apicella*, nomenclature of ; Staint., Ent. M. M. xxii, p. 236. *N. apicella*, habits ; Sang, l. c.
- Bucculatrix myriceæ*, Rag., metamorphoses ; Laf., Ann. Soc. Ent. Fr. (6) v, p. 421.
- B. albiguttella*, Cannes, Mill., Bull. Soc. Ent. Fr. (6) vi, p. xxiii, n. sp.
- Trifurcula pallidella*, food-plant ; Staint., Ent. M. M. xxii, p. 263 ; Hodg., op. cit. xxiii, p. 15.

PTEROPHORIDÆ and ALUCITIDÆ.

[Cf. Meyrick (442), Swinhoe & Walsingham (692).]

Pterophoridaæ, classification discussed, the genera tabulated, described at length ; Meyr., Tr. E. Soc. 1886, pp. 1-21.

Aciptilia atomosa, Bombay, Walsingm., P. Z. S. 1885, p. 885, n. sp.

Oxyptilus celeusi, Frey, described at length as a valid species ; Schmid, CB. Ver. Regensb. xl, pp. 200-202. *O. hieracii* = (*teucarii*, Jord., and *celeusi*, Schmid) ; Frey, S. E. Z. xlvii, p. 18. *O. leonuri* noticed ; Stange, S. E. Z. xlvii, p. 285. *O. nigrociliatus*, Z., habits, metamorphoses ; Riley, Rep. 1885, p. 326.

Amblyptilia calaminthæ, Schmid, noticed, differentiated from *A. acanthodactylus*, &c., and larva described ; Frey, S. E. Z. xlvii, pp. 16 & 17.

Leioptilus distinctus, H.-S., food-plant, S. E. Z. xlvii, p. 18. *L. brachydactylus*, habits of larva ; Stange, S. E. Z. xlvii, p. 286.

Scoptonoma, Zell., belongs to *Botydidæ* ; Meyr., Tr. E. Soc. 1886, p. 2. *Agdistis satanas*, Mill., larva and habits described ; Mill., Nat. Sicil. v, p. 221.

Pterophorus tetradactylus, larva described ; Porritt, Ent. M. M. xxiii, p. 112. *P. acanthodactylus*, larva described ; *id. t. c.* p. 132. *P. dichrodactylus* and *bertrami* noticed ; *id. t. c.* p. 163. *P. oxydactylus* and *congrualis*, Walk., noticed, the first referred to *Aciptilia*, the second as two species to *Aciptilia* and *Mimeseoptilus* ; Walsingm., P. Z. S. 1885, p. 885.

Cosmoclostis, n. g., p. 7, for *O. aglaodesma*, New South Wales, n. sp., p. 13; Meyr., Tr. E. Soc. 1886.

Trichoptilus scythrodes, p. 13, *ceramodes*, *xerodes*, p. 14, Australia, *leptomeres*, Réunion, p. 18, *compsochaeres*, Cape Verde Is., *centetes*, New Guinea, p. 16. Meyr., Tr. E. Soc. 1886 : n. spp.

Sphenarches, n. g., p. 8, for *S. synophrys*, n. sp., New Hebrides and Tonga Is., p. 17; Meyr., Tr. E. Soc. 1886.

Platyptilus similidactylus, distinctions of the two broods; Stange, S. E. Z. xlvii, p. 285. *P. farfarellus*, habits of larva; *id. loc. cit.*

P. hemimetra, Réunion, Meyr., Tr. E. Soc. 1886, p. 18, n. sp.

Marasmarcha, n. g., p. 11, for *M. liophanes*, Réunion, n. sp., p. 19, and *Mimeseoptilus phæodactyla*, Hb.; Meyr., Tr. E. Soc. 1886.

Mimeseoptilus phæonephes, Tasmania, p. 19, *leuconeophes*, N. S. Wales, p. 20, Meyr., Tr. E. Soc. 1886, n. spp.

Doxosteres n. g., for *Mimeseoptilus canalis*, Walk.; Meyr., Tr. E. Soc. 1886, p. 10.

Alucitidæ, the family and generic characters discussed; Meyr., Tr. E. Soc. 1886, pp. 5 & 12.

Alucita phricodes, Australia, Meyr., Tr. E. Soc. 1886, p. 20, n. sp.

(D.) *DIPTERA*.

[Cf. Aloï (5), Becher (38), Beling (43, 44), Bigot (53), Coquillett (126, 127, 128), Costa (131, 132), Dziedzicki (158), Gercke (242), Girschner (245), Inchbald & Meade (322), Karsch (335, 336, 339, 340), Kieffer (349), Meinert (433, 435), Mik (446, 447, 448, 449, 450), Möller (461), Neuhaus (480), Osten-Sacken (247, 507, 508), Pokorny (530), Röder (615, 616), Sahlberg (625), Sasaki (630), Schnabl (638), Schoyen (643), Targioni-Tozzetti (694), Trail (703), Verrall (713, 714), Vogler (717), Wený (730), Weyenbergh (734), Williston (741, 742, 743).]

Wing-neuration ; Redtenbacher (581), pp. 204-209, pls. xvii pt., xviii pt. Structure of eye ; Ciaccio (123). Salivary-glands ; Knüppel (356). Blood tissues ; Wielowiejski, (736) pp. 513-523. Spermatozoa ; Gilson (243). Formation of egg ; Korschelt, (369) pp. 574-580 ; Stuhlmann (690). Embryology (of *Muscidae*) ; Kowalevsky (371). Condition of the heart during metamorphosis ; *id.* (372). Fossil ; Omboni (506).

Eine dipterologische Notiz, Mik., Ent. Nachr. xii, pp. 315 & 316, relates to pairing between immature *Diptera*, so that a false idea of Parthenogenesis might be formed.

An unknown. presumed Dipterous, larva parasitic on *Julus fallax* ; Haase, Zool. Beitr. 1885, pp. 252-255, pl. xxxi (cf. Wien. ent. Z. v, p. 31).

Eggs of an unknown Dipterous insect described and figured ; Laboul., Ann. Soc. Ent. Fr. (6) vi, p. 285, pl. iv, figs. 1, 2, & 3.

Dziedzicki (Einige Worte über die Präparation des Hypopygiums der Dipteren, Wien. Ent. Z. v, pp. 25-27) recommends a process for separating the hypopygium and preparing it for examination by caustic potash.

CECIDOMYIIDÆ.

Cecidomyiidae : a single Central American species recorded ; Ost.-Sack., Biol. Centr. Am. Dipt. p. 1.

Lasioptera populnea described at length, p. 308 ; its galls on *Populus alba* figured, pl. v ; Wachtl., Wien. ent. Z. v.

Cecidomyia-galls ; Cameron (109).

Cecidomyia larvæ, and *Cryptogamia* ; Thomas (697).

Cecidomyia liriiodendri, galls of ; Hagen, Canad. Ent. xviii, p. 159. *C. æneophila*, the galls of ; Thomas, Ent. Nachr. xii, pp. 129-135, 199 & 200. *C. taxi*, Inchb., literature of, noticed ; Löw, Verh. z.-b. Wien, xxxvi, pp. 100-102 : reference to figure of galls of ; Wien. ent. Z. v, p. 61. *C. clausilia*, Bouché, imago described ; Ent. xix, p. 224. *C. destructor*, Say,

various points discussed ; Orm., Rep. x, pp. 10-26 & 101-105 ; [*cf.* also (511, 512), and Whitehead (735).] *C.* (? *tritici*, Kirb.), ravages, habits of larva ; Orm., Rep. ix, pp. 27-29. *C. caricis*, larva noticed ; Ent. xix, p. 10. *C. tubicola* : "The breastbone of the larva homologous to the labrum" ; Hagen, Ent. Am. i, p. 229. *C. leguminicola*, Lint., ♂ ♀, and details figured ; Fletcher, Rep. 1885, p. 12. *C. moraviae*, Wachtl., described at length, p. 209 ; its galls on *Lychnis viscaria* figured, pl. iii ; Wachtl, Wien. ent. Z. v. *C. saliciperda*, Duf., has for parasite *Torymus fuscipes* ; Boh., Wien. ent. Z. v, p. 307. *C. inclusa*, near Stockholm ; Ent. Tidskr. 1886, p. 120. *C. n. sp.* ? (? *œnophila*, Haim.) ; Aloï (5). *C. sp.* ? living on *Viola odorata*, habits, &c. ; Calloni (103).

C. muricata, England, Meade, Ent. xix, p. 153 ; *C. inehbaldiana* (= *clausilia*, Inchb., Ent. 1886, p. 224), Mik, Wien. ent. Z. v, p. 317 ; *C. raphanistri* (♂ ♀, larva and galls), p. 324, *betuleti* (♀, larva and galls), p. 326, *schlectendali* (♂ ♀, larva and galls), p. 328, *affinis* (♀, larva and galls), p. 330, *viscariae* (♀, larva and galls), Bitsch, Kieff., Z. Naturw. lix : n. spp.

Diplosis : Ost.-Sack. points out that passages in Ledermüller's Mikroskop. Gemüths und Augen-Ergötzung of date, 1763, probably refer to a *Diplosis* ; Wien. ent. Z. v, p. 42. *D. tamaricis*, Koll., galls noticed ; Wachtl, Wien. ent. Z. v, p. 210. *D. nigra* (?) Meig., with provisional n. n. *pyrivora*, p. 287, habits, ravages, enemies, description, &c. ; Riley, Rep. 1885, pp. 283-289, pl. vii, figs. 2, 3, & 4.

D. coryligallarum, Sicily, p. 422, pl. xvi, figs. 1, 3, 4, 5, 8, *oleisuga*, Italy, p. 428, pl. xvi, figs. 267, Targ.-Tozz., Bull. Ent. Ital. 1886, n. spp.

Hormomyia fischeri, Frf. ; *Torymus ventralis*, Fonsc., is parasitic on this ; Wien. ent. Z. v, p. 307. *H. piligera*, Lw., development of galls of ; Löw., Verh. z.-b. Wien, xxxvi, pp. 97-100.

H. abrotani, Scotland, Trail, Scot. Nat. (n.s.) i, p. 250, n. sp.

Asynapta pectoralis, Wtz., habits noticed ; Wachtl, Wien. ent. Z. v, p. 210.

MYCETOPHILIDÆ.

Mycetophilidæ, six Central American species catalogued ; Ost.-Sack., Biol. Cent. Am. Dipt. p. 2.

Zygoneura toxoneura, reference to description of larva of ; Ost.-Sack., Wien. ent. Z. v, p. 42.

Sciara : metamorphoses of the following described by Beling, Wien. ent. Z. v, viz :—*S. belingi*, Winn., *bicolor*, Meig., p. 13, *concolor*, Bel., p. 14, *dispar* and *egregia*, Bel., p. 71, *glabricollis*, Winn., *hortulana*, Bel., p. 72, *nigrescens*, Winn., p. 73, *tremula*, Bel., p. 74, *rufiventris*, Macq., p. 93, *arenaria*, Bel., *carbonaria*, Meig., p. 94, *fusca*, Winn., *gregaria*, Bel., p. 95, *hispidia*, Winn., p. 96, *lutaria*, Winn., p. 129, *militaris*, Now., p. 130, *montana* and *opaca*, Winn., p. 131, *quercicola*, Winn., p. 132, *socialis* and *solani*, Winn., *sylvatica*, Meig., p. 133, *sylvicola*, Winn., p. 134.

S. globiceps, Jan Mayen, Becher Ins. Jan Mayen, p. 62, pl. v, figs. 2, 2a-d ; *S. marginalis*, Bogota, Röder, S. E. Z. xlvii, p. 258 : n. spp.

Mycetophila lubomirskii, S. Russia, p. 229, *obscura*, Poland, p. 230, *con-*

fusa, *nigrofusca*, p. 251, *russata*, p. 252, S. Russia, *sigillata*, p. 265, *guttata* and *signatoides* (these three mixed by Winn. with *M. signata*), p. 326, Europe, *mohilevensis*, p. 326, *bialorussica*, p. 346, vol. v, *mikii*, p. 37, S. Russia, *fuliginosa*, Poland, p. 38, *triangulata*, *confluens*, p. 39, *W-fuscum*, p. 40, *osten-sackeni*, p. 41, S. Russia, vol. vi, Dzied., Wien. ent. Z., n. spp.

Mycothera schnablui, p. 155, *immaculata*, *stylata*, p. 189, S. Russia; Dzied., Wien. ent. Z. v, n. spp.

Stageria unicornuta, S. Russia; Dzied., Wien. ent. Z. v, p. 43, n. sp.

Monoclona, n. n. for *Stageria*, Wulp, nec Rond.; Mik, Wien. ent. Z. v, p. 279.

Parexechia, n. g., p. 62, near *Dynatosoma*, for *P. concolor*, Jan Mayen, n. sp., p. 63, pl. v, figs. 3, 3a-c; Becher, Ins. Jan Mayen.

Allocotocera, n. n. for *Eurycera*, Dzied. 1885 (præoc. in *Hemiptera*); Mik, Wien. ent. Z. v, p. 102.

SIMULIIDÆ.

Three Central American species recorded; Ost.-Sack., Biol. Centr. Am. Dipt. p. 5.

Simulium: tracheal gills of pupæ, Vogler (717): *S. sp.*, habits of larva in N. America; Packd., Am. Nat. xx, pp. 650 & 651. *S. ornatum*, larva and biology, figs. 115-127, pp. 458-464; Meinert, Dan. Selsk. Skr. iii.

BIBIONIDÆ.

Twenty-four Central American species catalogued; Ost.-Sack., Biol. Centr. Am. Dipt. pp. 2-5.

Plecia plagiata, Wied., synonymy noticed, = ? (*similis*, Rond.); Ost.-Sack., Biol. Centr. Am. Dipt. p. 3.

Scatopse flavicollis, Meig, noticed; Wien. ent. Z. v, p. 277.

S. incompleta, *subnitens*, p. 180, *minutissima*, p. 181, England, Verr., Ent. M. M. xxii, n. spp.

Corynoscelis eximia, Boh., noticed; Mik, Wien. ent. Z. v, p. 276.

BLEPHAROCERIDÆ.

One Central American species noticed; Ost.-Sack., Biol. Centr. Am. Dipt. p. 5.

Blepharocera, sp., early stages of; Am. Nat. xx, p. 651.

CULICIDÆ and CHIRONOMIDÆ.

Five Central American species noticed; Ost.-Sack., Biol. Centr. Am. Dipt. pp. 5 & 6.

Mochlonyx culiciformis, larva, biology, pp. 422-434, figs. 59-71; Meinert, Dan. Selsk. Skr. iii.

Corethra plumicornis, larva and biology, pp. 398-421, figs. 36-56, *pallida*, p. 421, figs. 57 & 58; Meinert, Dan. Selsk. Skr. iii.

Anopheles maculipennis, p. 393, fig. 20-31, *nigripes*, p. 395, figs. 32-35, larvæ, biology; Meinert, Dan. Selsk. Skr. iii.

Culex annulatus, p. 376, figs. 1-16, *nemorosus*, p. 377, figs. 17-19, larvæ and biology; Meinert, Dan. Selsk. Skr. iii.

Chironomus venustus, figs. 76-85, *plumosus*, figs. 86-89, *motilator*, figs. 90 & 91, pp. 436-444, larvæ and biology; Meinert, Dan. Selsk. Skr. iii. *C. sp.*, larva developing in cups of *Silphium perfoliatum*; Ent. Am. i, p. 211.

C. fluminicola, pl. v, fig. 1, *cordovens*, figs. 2 & 3, p. 127, *triornatus*, fig. 4, *macularis*, figs. 5, 6, & 7, p. 128, *hircus*, fig. 9, *chlorophilus*, fig. 10, *sanus*, fig. 11, p. 129, *lepidus*, fig. 12, *severus*, fig. 13, *innocens*, fig. 14, *tutulifer*, fig. 15, p. 130, Argentine Rep., Weyenb., Tijdschr. Ent. xxix; *C. incertus*, p. 63, pl. v, figs. 4, 4a, & 4b, *callosus*, p. 64, pl. v, figs. 5, 5a, & 5b, Jan Mayen, Becher, Ins. Jan. Mayen: n. spp.

Tanypus varius, figs. 92-100, *monilis*, figs. 100 & 101, *plumipes*, fig. 102, pp. 445-451, larva, biology; Meinert, Dan. Selsk. Skr. iii.

Ceratopogon circumdatum, larva and biology; Meinert, Dan. Selsk. Skr. iii, pp. 464-468, figs. 128-137. *C. murinus*, Winn., note on biology of; Gercke, Wien. ent. Z. v, p. 164: pupa, pl. ii, fig. 5.

C. crudelis, Berlin, Karsch, B. E. Z. p. xviii, n. sp.

Burmeisteria, n. g. for *B. photophila*, Argentine Rep., n. sp.; Weyenb., Tijdschr. Ent. xxix, p. 130, pl. v, figs. 16, 17, & 18.

PSYCHODIDÆ.

Psychoda venusta, Argentine Rep., Weyenb., Tijdschr. Ent. xxix, p. 132, n. sp.

TIPULIDÆ.

Thirty-seven species are recorded as Central-American by Ost.-Sack., Biol. Centr. Am. Dipt. pp. 6-20.

Table of the characters of many genera and species of *Tipulidæ* larvæ; Beling, Verh. z.-b. Wien, xxxvi, pp. 203-213.

"*Limnobia anomala*," Ost.-Sack.; this group specially noticed; Verr., Ent. M. M. xxii, p. 182.

Limnobiadæ, British genera tabulated; Verr., Ent. M. M. xxiii, pp. 121-123.

Limnobia, British species tabulated; Verr., Ent. M. M. xxiii, pp. 124 & 125. *L. dumetorum*, Meig., p. 201, *flavipes*, Fab., p. 202, metamorphoses described; Beling, Verh. z.-b. Wien, xxxvi.

L. nitida, England, Verr., Ent. M. M. xxiii, p. 124; *L. ocellata*, Ecuador, Röder, S. E. Z. xlvii, p. 259: n. spp.

Dicranomyia, British species tabulated; Verr., Ent. M. M. xxiii, p. 156. *D. pilipennis*, Egg., synonymy discussed; *id. t. c.* p. 157. *D. modesta*, chorea, *sericata*, *dumetorum* noticed; *id. t. c.* pp. 158-160.

D. aquosa, Scotland, Verr., Ent. M. M. xxiii, p. 156; *D. tipulipes*, Pungo Andongo, Karsch, Ent. Nachr. xii, p. 51: n. spp.

Teucholabis molesta, p. 6, *gracilis*, p. 7, Mexico, Ost.-Sack., Biol. Centr. Am. Dipt., n. spp.

Paratropesa preusta, Mexico, Ost.-Sack., Biol. Centr. Am. Dipt. p. 8, n. sp.

Elliptera ommissa, Egg., metamorphoses described and structures figured ; Mik., Wien. ent. Z. v, pp. 337-344, pl. vi.

Dasyptera hæmorrhoidalis, Zett., metamorphoses described ; Beling, Verh. z.-b. Wien, xxxvi, p. 191.

Trichosticha icterica, Egg., *lutea*, Meig., metamorphoses described ; Beling, Verh. z.-b. Wien, xxxvi, p. 192.

Erioptera ochracea, Meig., metamorphoses described ; Beling, Verh. z.-b. Wien, xxxvi, p. 194.

Molophilus appendiculatus, Stæg., *ochraceus*, Meig., and *propinquus*, Egg., noticed ; Verr., Ent. M. M. xxii, p. 199.

M. bifilatus, Britain, Verr., Ent. M. M. xxii, p. 199, n. sp.

Trimicra (or *Mycetophilidæ*), luminous larva of, from N. Zealand, noticed ; Ent. M. M. xxiii, pp. 99-101 & 133.

Gonomyia schistacea, Schum., metamorphoses described ; Beling, Verh. z.-b. Wien, xxxvi, p. 195.

Symplecta grata, Lw., belongs to *Psiloconopa*, Zett. ; Mik, Wien. ent. Z. v, p. 318.

Symplectomorpha, n. g., type *Symplecta stictica*, Meig. ; Mik, Wien. ent. Z. v, p. 318.

Limnophila fuscipennis, Meig., p. 197, *hyalipennis*, Zett., p. 198, *lineola*, Meig., p. 199, *nemoralis*, Meig., p. 200, metamorphoses described ; Beling, Verh. z.-b. Wien, xxxvi. *L. fuscipennis* and *discicollis*, Meig., noticed ; Verr., Ent. M. M. xxii, p. 200.

L. sepium, S. England, Verr., Ent. M. M. xxii, p. 200, n. sp.

Pacilostola punctata, Meig., metamorphoses described ; Beling, Verh. z.-b. Wien, xxxvi, p. 195.

Epiphragma circinata, Costa Rica, Ost.-Sack., Biol. Centr. Am. Dipt. p. 9, pl. i, fig. 1, n. sp.

Trichocera simonyi, Rhætian Alps, Mik, Wien. ent. Z. v, p. 57 ; *T. lutea*, Jan Mayen, Becher, Ins. Jan Mayen, p. 64, pl. v, figs. 7, 7a, & 7b : n. spp.

Eriocera mesoxantha, *zonata*, p. 10, *hæmorrhœa*, Mexico, *erythræa*, Guatemala, p. 11, *gracilis*, *pretiosa*, Mexico, p. 12, *lessepsi*, Panama, p. 13, Ost.-Sack., Biol. Centr. Am. Dipt. n. spp.

Ptychoptera palustris, Meig., larva described ; Beling, Verh. z.-b. Wien, xxxvi, p. 171.

Tipula dilatata, Schum., p. 176, *gigantea*, Schrank, p. 177, *hortulana*, Meig., p. 178, *longicornis*, Schum., p. 179, *luteipennis*, Meig., p. 181, *marmorata*, Meig., p. 182, *micans*, Zett., p. 183, *pruinosa*, Wied., p. 184, *subnodicornis*, Zett., p. 185, *varipennis* and *vittata*, Meig., p. 186, *winnertzi*, Egg., p. 188, metamorphoses described ; Beling, Verh. z.-b. Wien, xxxvi. *T. oleracea*, L., ravages of ; Orm, Rep. ix, pp. 19-22. *T. monilifera*, Loew, p. 13, *craverii*, Bell., p. 15, noticed ; Ost.-Sack., Biol. Centr. Am. Dipt.

T. virgo, Mexico, p. 14, Ost.-Sack., Biol. Centr. Am. Dipt. ; *T. moniliformis*, Ecuador, Röder, S. E. Z. xlvii, p. 259 : n. spp.

Pachyrhina analis, Schum., p. 172, *annulicornis*, Meig., p. 173, *pratensis*, L., p. 175, metamorphoses described ; Beling, Verh. z.-b. Wien, xxxvi.

P. ordinaria, Mexico, p. 16, *consularis*, = (*elegans*, Schin. nec F.), Costa Rica to Venezuela, *usta*, Costa Rica, p. 17, Ost.-Sack., Biol. Centr.

Am. Dipt. ; *P. fuscipennis*, Pungo Andongo, Karsch, Ent. Nachr. xii, p. 52 : n. spp.

Dolichopeza, Curt., note on the 3 species of ; Karsch, Ent. Nachr. xii, p. 284. *D.* and its relatives ; Ost.-Sack., pp. 155-164 ; B. E. Z. xxx. *D. sylvicola*, Curt., metamorphoses described ; Beling, Verh. z.-b. Wien, xxxvi, p. 189.

D. malagasya, Madagascar, Karsch, B. E. Z. xxx, p. 64, n. sp.

Brachyprémna, n. g. for *Tipula dispellens*, Walk., and some Brazilian species ; Ost.-Sack., B. E. Z. xxx, p. 161.

Ctenophora and its relatives, including a list of all the known species and their localities, with synonymical remarks on various species ; Ost.-Sack., B. E. Z. xxx, pp. 164-175.

Pselliophora, n. g., for 16 known species (Asiatic and Malasian) of *Ctenophora* ; Ost.-Sack., B. E. Z. xxx, p. 165. *P. rubra*, Laos, Ost.-Sack., p. 171, n. sp.

Xiphura and *Ctenophora*, early stages of, compared ; Ost.-Sack., B. E. Z. xxx, p. 173.

Ptilogyne : on the Australian *Tipulina*, with pectinate antennæ, and especially on the genus *Ptilogyne*, Westw. ; Ost.-Sack., B. E. Z. xxx, pp. 175-178.

On the South-American *Tipulina*, with pectinate antennæ ; *Ctedonia*, Phil., and *Ozodicera*, Macq. ; Ost.-Sack., B. E. Z. xxx, pp. 178-181.

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Macrothorax, Jaen., *Longurio*, Loew, *Holorusia*, id., *Stygeropsis*, id., *Tipula*, Lin., *Pachyrrhina*, Macq., and *Nephrotoma*, Meig., discussed ; Ost.-Sack., B. E. Z. xxx, pp. 182-187.

Macromastix, n. n. for *Macrothorax*, Jaen, which is redescribed ; Ost.-Sack., B. E. Z. xxx, p. 185.

Tanyprémna, n. g., for *T. opilio*, Guatemala, n. sp., pl. i, fig. 2 ; Ost.-Sack., Biol. Centr. Am. Dipt.

DIXIDÆ.

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Rhyphus fuscatus, Colombia ; Rüd., S. E. Z. xlvii, p. 260, n. sp.

Olbiogaster, n. g., p. 23, for *O. cognatus*, Costa Rica, n. sp., p. 21 ; Ost.-Sack., Biol. Centr. Am. Dipt.

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Rhachicerus bellus, Panama, n. sp., p. 62 ; Ost.-Sack., Biol. Centr. Am. Dipt.

Rhingiopsis, n. g., for *R. tau*, Brazil; n. sp.; Röd., Ent. Nachr. xii, pp. 138 & 201.

Mycosargus fasciatus, Br., note on var. of; Röd., Ent. Nachr. xii, p. 139.

Melanochoa (Schin. Brauer), n. g., p. 139, for *M. dubia* (Schin. Brauer), Brazil, n. sp.; Röd., Ent. Nachr. xii, p. 140.

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Subula elongata, Guatemala, Ost.-Sack., Biol. Centr. Am. Dipt. p. 22, n. sp.

Sargus concinnus, Guatemala, Brazil, Ost.-Sack., Biol. Centr. Am. Dipt. p. 24, n. sp.

Ptecticus figlinus, Guatemala, Ost.-Sack., Biol. Centr. Am. Dipt. p. 24, n. sp.

Rhaphiocera pampinus, Panama, p. 25, *caloptera*, Mexico, p. 26, Ost.-Sack., Biol. Centr. Am. Dipt., n. spp.

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Cyphomyia androgyna, Panama, Ost.-Sack., Biol. Centr. Am. Dipt. p. 34, n. sp.

C. albitarsis, Bell., noticed; Ost.-Sack., Biol. Centr. Am. Dipt. p. 35.

Stratiomyia mutabilis, *subalba*, Bell., noticed; Ost.-Sack., Biol. Centr. Am. Dipt. p. 37.

Aochletus, n. g., for *A. cinctus*, Sonora, n. sp.; Ost.-Sack., Biol. Centr. Am. Dipt. p. 38.

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Acanthina argentea, Costa Rica, Ost.-Sack., Biol. Centr. Am. Dipt. p. 41, n. sp.

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The characters of the family discussed, pp. 63-66; *Megalemyia*, Big., was established on the male sex of *Acanthomera*, p. 64, Ost.-Sack., Biol. Centr. Am. Dipt. *Megalemyia*, note on the genus, and on *M. seticornis*; Big., Bull. Soc. Ent. Fr. (6) vi, pp. clxvii & clxviii.

Rhaphiorhynchus planiventris, Wied., = (*A. bigoti*, Bell., and *A. crassipalpis*, Macq.): Ost.-Sack., Biol. Centr. Am. Dipt. p. 66.

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Chrysops alliragus, Mexico, pl. i, figs. 6 & 7, p. 45, *tanycerus*, Costa Rica, p. 46, Ost.-Sack., Biol. Centr. Am. Dipt., n. spp.

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Tabanus nigripalpis, Macq., var. ? from Ecuador described, p. 262 ; *T. auribarbis* noticed, p. 263 : Röder, S. E. Z. xlvii. *T. oculus*, *bipartitus*, Walk. (rejected in favour of *albonotatus*, Bell.), *commixtus*, Walk., noticed, pp. 55 & 56 : Ost.-Sack., Biol. Centr. Am. Dipt. *T. quadripunctatus*, F., *bigoti*, Bell., descriptions supplemented, p. 48, unnamed species described, p. 49 ; *id. t. c.*

T. ebrius, Costa Rica, Panama, p. 49, pl. i, fig. 8, *erebus*, Nicaragua, Panama, p. 50, *corone*, Guatemala, p. 51, *bifenestratus*, pl. i, fig. 19, *cribellum*, pl. i, fig. 10, Mexico, p. 52, *chionostigma*, Guatemala, pl. i, fig. 11, *venenatus*, Guatemala, Panama, p. 54, Ost.-Sack., Biol. Centr. Am. Dipt. : n. spp.

Stibasoma fulvohirtum, Wied., = (*T. compactus*, Walk.), noticed ; Ost.-Sack., Biol. Centr. Am. Dipt. p. 57.

LEPTIDÆ.

Ueber eine zweite Leptide mit nur vier Hinterrandszellen und an die Discoidalzelle stossender vierter ; Karsch, Ent. Nachr. xii, p. 140.

Leptynoma, Westd., and *Lampromyia*, Macq., are probably the same ; Big., Bull. Soc. Ent. Fr. (6) v, p. cxcii.

Chrysopila : four species from Central America noticed ; Ost.-Sack., Biol. Centr. Am. Am. Dipt. pp. 60 & 61 ; *Atherix longipes*, Bell., noticed ; and eight other *Leptidæ* recorded as Central American, p. 62, *t. c.*

C. alpicola, Austria, Pok., Wien. ent. Z. v, p. 194, n. sp.

Agnotomyia, n. g. for *Stygia elongata*, Say ; Will., Ent. Am. ii, p. 106.

Arthroceras, n. g., p. 107, for *A. pollinosum*, N. America, n. sp., p. 108 ; Will., Ent. Am. ii.

Macellopalpus, n. g., near *Atherix*, for *M. flaveolus*, New Guinea, n. sp. ; Big., Bull. Soc. Ent. Fr. (6) vi, p. xlviii.

Symphoromyia pachyceras, *plagens*, N. America, Will., Tr. Am. Ent. Soc. xiii, p. 287, n. spp.

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Myelaphus lobicornis, Ost.-Sack., *rufus*, Will., noticed ; Will., Tr. Am. Ent. Soc. xiii, p. 288.

Stenopogon eucidinus, Kansas, Will., Tr. Am. Ent. Soc. xiii, p. 289, n. sp.

Stichopogon trifasciatus, Say, synonymy given, Will., Tr. Am. Ent. Soc. xiii, p. 289.

Atomosia (Atractia) mikii, San Domingo, Will., Tr. Am. Ent. Soc. xiii, p. 290, n. sp.

Ceraturgus nigripes, N. America, Will., Tr. Am. Ent. Soc. xiii, p. 288, n. sp.

Spanurus compressus, Pungo Andongo, Karsch, Ent. Nachr. xii, p. 56, n. sp.

Laparus faustus, Cape Good Hope, p. 71, *apertus*, Gaboon, p. 72, Karsch, B. E. Z. xxx, n. spp.

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Leptomidas pantherinus, Gerst., sexual differences noted; Will., Ent. Am. xiii, p. 291.

L. sponsor, Guatemala, p. 68, *brachyrhynchus*, Mexico, p. 69, Ost.-Sack., Biol. Centr. Am. Dipt., n. spp.

Midas rubidapex, Wied., *dives*, Westw., noticed, p. 70; Ost.-Sack., Biol. Centr. Am. Dipt.

M. decôr, Panama, p. 71, *chrysites*, *cleptes*, Mexico, p. 72, Ost.-Sack., Biol. Centr. Am. Dipt.; *M. scitulus*, Arizona, Will., Tr. Am. Ent. Soc. xiii, p. 291 : n. spp.

Ectypus limbatus, Arizona, Will., Tr. Am. Ent. Soc. xiii, p. 292, n. sp.
Apiocera brevicornis, Phil., note on; Ost.-Sack., B. E. Z. xxx, p. 139.

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Rhynchocephalus sp. ? described from Guatemala; Ost.-Sack., Biol. Centr. Am. Dipt. p. 73.

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H. flavipes, N. America, Will., Tr. Am. Ent. Soc. xiii, p. 292 : n. spp.

BOMBYLIIDÆ.

The North and Central American Genera of *Bombyliidæ* tabulated (27 genera) : Ost.-Sack., Biol. Centr. Am. Dipt. pp. 75-77.

Exoprosopa, characters of, and allied genera, and subgenera discussed at length, Ost.-Sack., Biol. Centr. Am. Dipt. pp. 77-80; *E. caliptera*, Say, pl. i, fig. 12, *pueblensis*, *anthracoides*, *rostrifera*, Jaen., noticed, *limbipennis*, Macq., described at length, *id. t. c.*

E. iota, pl. i, fig. 13, p. 82, *rhea*, pl. i, fig. 14, p. 83, Mexico, *procne*, Guatemala, p. 85, *filia*, p. 86, *socia*, p. 87, *pardus*, pl. i, fig. 15, p. 38, Mexico, Ost.-Sack., Biol. Centr. Am. Dipt., n. spp.

Hyperalonia albiventris, Macq., = (*Anthrax hela*, Er.), synonymy discussed; *H. pilatei*, Macq., pl. i, fig. 16, var., *proserpina*, Wied., = (*A. rufescens*, Walk.), *latreillei*, Wied., pl. i, fig. 18, ii, fig. 1, noticed or described; *H. dido*, Mexico, pl. i, fig. 17, p. 91, n. sp.; Ost.-Sack., Biol. Centr. Am. Dipt.

Stonyx, n. g., p. 91, for *Anthrax clotho*, Wied., which is figured, pl. ii, fig. 2, *A. lucera*, Wied., and *S. delia*, Sonora, n. sp., pl. ii, fig. 3, p. 95; Ost.-Sack., Biol. Centr. Am. Dipt.

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Argyramæba, Schin., characters of genus discussed, and the Central American species noticed or described at length, viz.: *A. simson*, Fab., *acroleuca*, Wied., *analis*, Say, *pluto*, Wied., and *fur*, Ost.-Sack.; Ost.-Sack., Biol. Centr. Am. Dipt. pp. 98-106; *A. subnotata*, Meig., habits of larva: Lampert, JH. Ver. Württ. xlii, pp. 97 & 98.

A. seriepunctata, Sonora, pl. ii, fig. 5, p. 103, *daphne*, Sonora, pl. ii, fig. 6, p. 104, Ost.-Sack., Biol. Centr. Am. Dipt., n. spp.

Astrophanes, n. g., p. 106, for *A. adonis*, Sonora, n. sp., p. 107; Ost.-Sack., Biol. Centr. Am. Dipt.

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Anthrax and allies, tabulation of N. American genera; Coq., Canad. Ent. xviii, p. 158. *A.*, Scop., = (*Dipalta*, Ost.-Sack.); *id. t. c.* p. 157. *A.*, Scop., discussed, and the Central American species tabulated, pp. 111-115, the following known species noticed or figured: *cyanoptera*, Wied., *lucifer*, Wied., *fuliginosa*, Loew, *edititia*, Say, pl. ii, fig. 13, *paradoxa*, Jaen.; n. subgen., *Pecilanthrax*, p. 121, *Chrysanthrax*, p. 121, *Thyridanthrax*, p. 123, *Hyalanthrax*, p. 134; *A. palliata*, Loew, and *castanea*, Jaen.; Ost.-Sack., Biol. Centr. Am. Dipt. *A. trifusciata*, habits, pp. 129, et seq., primary larva, p. 205, secondary, p. 131, pupa, p. 148; Fabre, Souven. iii.

A. arethusa, Mexico to Costa Rica, pl. ii, fig. 11, p. 116, *pæcilogaster*, California, Mexico, pl. ii, fig. 12, p. 118, *selene*, Sonora, pl. ii, fig. 14, p. 122, *galathea*, Costa Rica, pl. ii, fig. 15, p. 123, *ephebus*, p. 124, *cuniculus*, pl. ii, fig. 16, Mexico, *consul*, Guatemala, p. 125, *rex*, Sonora, pl. ii, fig. 17, p. 127, Ost.-Sack., Biol. Centr. Am. Dipt., n. spp.

Mancia, n. g. for *M. nana*, California, n. sp.; Coq., Canad. Ent. xviii, p. 159.

Peringueyimyia, n. g. near *Comastes*, for *P. capensis*, n. sp., Cape Good Hope; Big., Bull. Soc. Ent. Fr. (6) vi, p. cx.

Rhabdopselaphus, n. g. near *Dasypalpus*, p. ciii, for *R. mus*, California, n. sp., p. civ; Big., Bull. Soc. Ent. Fr. (6) vi.

Oncodocera leucoprocta and *valida*, Wied., note on; Röder, Wien. ent. Z. v, p. 264.

Aphæbantus, Lw., = (*Triodites*, Ost.-Sack.); Coq., Canad. Ent. xviii, p. 81.

A. litus, p. 84, *hirsutus*, p. 85, *vittatus*, p. 86, California; Coq., Canad. Ent. xviii, n. spp.

Eucessia, n. g. (*Lomatina*) for *E. rubens*, California, n. sp.; Coq., Canad. Ent. xviii, p. 82.

Leptochilus transitus, California, Coq., Canad. Ent. xviii, p. 83, n. sp.

Toxophora maculipennis, Pungo Andongo, Karsch., Ent. Nachr. xii, p. 56; *T. pellucida*, *maxima*, California, Coq., Ent. Am. i, p. 222: n. spp.

Sisyrophanus, n. g., p. 53, near *Eurycareus*, for *S. homeyeri*, Pungo Andongo, n. sp., p. 54, woodcut; Karsch, Ent. Nachr. xii.

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Thereva crassicornis, California, Will., Tr. Am. Ent. Soc. xiii, p. 294, n. sp.

SCENOPINIDÆ.

Scenopinus fenestralis, note on life-history of; Ost.-Sack., Ent. M. M. xxiii, p. 51. *S. pallipes*, Say, food of larva; Hagen, Canad. Ent. xviii, p. 73.

CYRTIDÆ.

Acrocera stelviana, Tyrol, Pok., Wien. ent. Z. v, p. 195; *A. liturata*, N. America, Will., Tr. Am. Ent. Soc. xiii, p. 294 : n. spp.

Paracrocera, n. g. for *Acrocera globulus*, Puz., and *tumida*, Er., also ? *borealis*, Zett., *leta*, Gerst. ; Mik, Wien. ent. Z. v, p. 276.

Lasia kletii, Ost.-Sack., generic position queried ; Will., Tr. Am. Ent. Soc. xiii, p. 294.

EMPIDÆ.

Empis gaigeri, Dalmatia, Gercke, Wien. ent. Z. v, p. 162, pl. ii figs. 3, & 4, n. sp.

Hilara alpina, Loew, its habits ; Ost.-Sack., Ent. Nachr. xii, p. 1.

Phacobalia pokornyi, S. Tyrol, Mik, Wien. ent. Z. v, p. 22, n. sp.

Hemerodromia albicornis, Meig, hypopygium and ♂ structure ; Gercke, Wien. ent. Z. v, pp. 166 & 167, pl. ii, fig. 12.

Thamnodromia, n. n., with synonymical discussion, for *Phyllodromia*, Zett., *nec* Serv. ; Mik, Wien. ent. Z. v, p. 278.

DOLICHOPODIDÆ.

Plagioneurus univittatus, Loew, ♂ described ; Will., Tr. Am. Ent. Soc. xiii, p. 295.

SYRPHIDÆ.

Catalogue of S. American ; Williston (742).

Eristalis tenax ; Ost.-Sack. (508).

E. montanus, Colombia ; Röder, S. E. Z. xlvii, p. 263, n. sp.

Lepidostola, n. n. for *Lepidomyia*, Lw., *nec* Big. ; Mik, Wien. ent. Z. v, p. 278.

PIPUNCULIDÆ.

Pipunculus opacus, N. America, Will., Tr. Am. Ent. Soc. xiii, p. 295, n. sp.

CESTRIDÆ.

Cestrus nasalis : the application of this name discussed and its use rejected ; Brauer, Wien. ent. Z. v, pp. 292, &c. *C. purpureus*, Brauer, the larvæ inhabit the nasal and frontal cavities and throat of horses ; Brauer, Wien. ent. Z. v, p. 275.

Rhinæstrus, n. g. for *Cestrus purpureus*, Brauer ; Brauer, Wien. ent. Z. v, p. 300 ; preparatory stages and imago described and figured, pp. 300-304, pl. iv.

Cephenomyia stimulator, Ck., larvæ found in lung of roe-deer ; Wien. ent. Z. v, p. 305.

Hypoderma bovis, infesting man : Schoyen (643) : its ravages, habits, structure of larva, &c. ; Orm., Rep. ix, pp. 85-108, and x, pp. 95-100. *H. sp.* ? attacking horse in England ; *id. t. c.* pp. 90-95.

Microcephalus, Schnabl., note on ; Brauer, Wien. ent. Z. v, p. 345.

TACHINIDÆ (and ACTIADÆ).

Ugimya sericaria, Rond., life-history, habits, ravages, and anatomy ; Sasaki (630).

Hyalomymia obesa, F., considered an extremely variable species, and a copious synonymy given, the variations being grouped under four forms, described with new names as varr. *umbripennis*, *nebulosa*, *latipennis*, *fascipennis* ; Girschner (245).

H. aneovertris, N. America, Will., Tr. Am. Ent. Soc. xiii, p. 296, n. sp.

Cistogaster divisa, Loew, sexes noticed, ♀ = (*Gymnosoma occidua*, Wlk.) ; Will., Tr. Am. Ent. Soc. xiii, p. 296.

Ocyptera umbripennis noticed ; Wulp, Tijdschr. Ent. xxix, p. cvii.

Besseria melanura, Meig., note on ; Mik, Ent. Nachr. xii, p. 204.

Dejeania corpulenta, Wied., and *plumitarsis*, Wulp, synonymy discussed ; Wulp, Tijdschr. Ent. xxix, pp. xxix-xxxii.

D. hystricosa, N. America, Will., Tr. Am. Ent. Soc. xiii, p. 297 ; *D. hecate*, Pungo Andongo, Karsch, Ent. Nachr. xii, p. 337 : n. spp.

Hystricia soror, Arizona, Will., Tr. Am. Ent. Soc. xiii, p. 298, n. sp.

Hystrichodexia, n. g., near *Hystriasyphona*, Bigot, for *H. armata*, Ecuador, n. sp. ; Röder, S. E. Z. xlvii, p. 266.

Jurinia notata, Walk., ♂ from Chimborazo described ; Röder, S. E. Z. xlvii, p. 264. *J. algens*, Wied., p. 298, *hystrix*, Fab., p. 299, *smaragdina*, Macq., *apicifera*, Walk., variations and characters described ; *J. (Fabricia) hystricoides*, N. America, n. sp., p. 300 ; Will., Tr. Am. Ent. Soc. xiii.

Echinomyia (Peleteria) filipalpis, Th., sexes described ; *hemorrhoea*, Wulp, *iterans*, Walk., noticed : Will., Tr. Am. Ent. Soc. xiii, p. 301.

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Micropalpus jocosus, Pungo Andongo, Karsch, Ent. Nachr. xii, p. 338, n. sp.

Masicera (Blepharipa) amplexiceps, Pungo Andongo, Karsch, Ent. Nachr. xii, p. 340, n. sp.

Gymnocheta vivida, *ruficornis*, Pennsylvania, Will., Tr. Am. Ent. Soc. xiii, p. 302 ; *G. glauca*, Pungo Andongo, Karsch, Ent. Nachr. xii, p. 339 : n. spp.

Exorista excavata, Zett., is parasite of *Chelonia villica*, Mik, Ent. Nachr. xii, p. 203 : specific distinctions of *E. excavata* and some allies ; *id. l. c.*

Exorista perlucida, Pungo Andongo, Karsch, Ent. Nachr. xii, p. 389, n. sp.

Nemorilla notabilis, Meig., parasitic on *Aspis udmanniana*, L. ; and *N. maculosa* on *Tortrix murinana*, Hb. : Wien. ent. Z. v, p. 307.

Saundersia (Tachina) signifera, Wlk. ?, described, p. 304 ; *S. maculata*, *bicolor*, New Mexico, p. 305 : Will., Tr. Am. Ent. Soc. xiii : n. spp.

Belvoisia bicincta noticed ; Will., Tr. Am. Ent. Soc. xiii, p. 302.

B. v. d. wulpi, San Domingo, Will., Tr. Am. Ent. Soc. xiii, p. 303, n. sp.

Melanophrys, n. g., for *M. flavipennis*, N. America, n. sp., p. 306 ; Will., Tr. Am. Ent. Soc. xiii.

Tachina sp., details as to manner of living of larva in other insects ; Meinert (435).

- T. vasta*, W. Africa, Karsch, Ent. Nachr. xii, p. 341, n. sp.
Masicera agilis and *Exorista flavicans* parasitic on *Bupulus piniarius*, L.; Wien. ent. Z. v, p. 307.
Phorocera somomyia, p. 340, *pulverulenta*, p. 341, Pungo Andongo, Karsch, Ent. Nachr. xii, n. spp.
Degeeria zetterstedtii, Pungo Andongo, Karsch, Ent. Nachr. xii, p. 342, n. sp.
Trigonospila, n. g. (group *Myobia*), for *T. picta*, Austria, n. sp.; Pok., Wien. ent. Z. v, p. 191.
Crossotocnema, n. g., p. cci, for *C. javana*, n. sp., p. ccii, Java; Big., Bull. Soc. Ent. Fr. (6) v.
Gonatorrhina, n. g., p. 264, near *Siphona*, Meig., for *G. paramonensis*, Colombia, n. sp., p. 265; Röder, S. E. Z. xlvii.
Actiade, Big., remarks on the genera of; Karsch, B. E. Z. xxx, pp. 135 & 136.
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- Microphthalma nigra*, Macq., note on; Will., Tr. Am. Ent. Soc. xiii, p. 306.
Phorostoma parvula, Portsch., bred from *Saperda populnea*, L.; Wien. ent. Z. v, p. 307.
Prosenia siberita, Fab., = (*flavipennis*, Wied.); Wulp, Tijdschr. Ent. xxix, p. cvii.

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- Ueber die Ent. Nachr. 1885, p. 3, beschriebene *Muscide*; Girschuer, Ent. Nachr. xii, p. 20, and Mik, t. c. pp. 200-204.
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Wulpia, n. g., for *W. caloptera*, Brazil, n. sp.; Big., Ann. Soc. Ent. Fr. (6) vi, p. 371.

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Enicopus fuscus, Mexico, Big., Ann. Soc. Ent. Fr. (6) vi, p. 387, n. sp.

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Echidnophaga, n. g. for *E. ambulans*, New South Wales (on *Echidna hystrix*), sp. n. ; Oll., P. Linn. Soc. N.S.W. (2) i, p. 172.

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[*Cf.* Ashmead (12), Bergroth (49, 50), Duda (155), Göldi (249), Horvath (308), Knüppel (356), Montandon (462), Nordin (488), Provancher (563), Puton (568), Sahlberg (626), Scott (646), Signoret (660), Uhler (708, 709), Waterhouse (724).

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Amaurocoris aspericollis, Tunis, Puton, Expl. sci. Tunisie, p. 15, n. sp.

Doljcoris baccarum, L., biological note on ; Nordin, Ent. Tidskr. 1886, p. 31.

Eurydema oleraceum and *ornatum* injurious to potatoes ; Karsch, Ent. Nachr. xii, pp. 301-304.

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Deræocoris annulipes, H.-S., noticed and discussed at length ; Duda, Wien. ent. Z. v, p. 85.

Lygus monachus, N. America, Uhler, Canad. Ent. xviii. p. 208, n. sp.

Systellonotus micelli, Ferr. : this name to be used for the Tunisian *S. albofasciatus*, which is distinct from the Algerian *S. albofasciatus*, Luc. ; Reut., Rev. d'Ent. v, p. 121 : the synonymy of the latter discussed ; t. c. p. 122.

Tenthecoris, n. g. near *Stiphrosoma*, for *T. bicolor*, n. sp. ; Scott, Ent. M. M. xxiii, p. 65. The habitat is doubtful, the insect having been found in a hot-house in Britain, but is presumed to come from West Indies or Bahia.

Dicyphus tamaricis, p. 19, *sedilloti*, p. 20, Tunis, Puton, Expl. sci. Tunisie, n. spp.

Roudairea, n. g., p. 21, near *Amblytylus*, for *R. crassicornis*, Tunis, n. sp., p. 22 ; Puton & Reut., Expl. sci. Tunisie, p. 22.

Agalliestes, Fieb., to give place to the prior name *Chlamydatus*, Curt. ; Reut., Rev. d'Ent, v, p. 122.

Campylomma zizyphi, Tunis, Reut., Puton Expl. sci. Tunisie, p. 20, n. sp.

Helopeltis, the species described, differentiated, and figured ; *H. bradyi*, p. 458, pl. xi, figs. 1 & 2, *theivora*, Assam, fig. 3, n. spp. ; Waterhouse, Tr. E. Soc. 1886, pp. 457-459, pl. xi.

CIMICIDÆ and ANTHOCORIDÆ.

Cimex lectularius, odoriferous glands ; Kunkel (382, 383).

Tetraphleps canadensis, Canada, Prov., Faun. Can. Hem. p. 90, n. sp.

REDUVIIDÆ.

Reduvius niayeti, Tunis, Puton, Expl. sci. Tunisie, p. 22, n. sp.

HYDROMETRIDÆ.

Halobates, habits, eggs, embryo, larvæ, pp. 233 & 234 ; *H. wüllerstorffi*, p. 181, *sericeus*, p. 182, *micans*, p. 231, *frauenfeldanus*, p. 232, noticed ; Witl., Wien. ent. Z. v.

H. splendens, South Pacific Ocean, West Coast of S. America, p. 178, *incanus*, Arabian Sea near Socotra, Witl., Wien. ent. Z. v (woodcuts, p. 180), n. spp.

Halobatodes histrio, *lituratus*, noticed ; Witl., Wien. ent. Z. v, pp. 232 & 233.

Æpophilus bonnairei, early stages and habits in Jersey ; Kœhler, Ann. Sci. Nat. (6) xx, art. No. 4, pp. 27-29, pl. i, figs. 2-9 : Kœhler's account and figure reproduced ; Sci. Goss. xxii, p. 56.

BELOSTOMATIDÆ and NEPIDÆ.

Belostomidæ as destroyers of fish ; Dimmock (141).

Belostoma americanum, attracted in large numbers by electric light ; Ent. Nachr. xii, p. 176.

Ranatra and *Nepa*, structure of eggs and eggshells of : Korschelt, Ent. Nachr. xii, pp. 306-308.

CORISIDÆ.

Sigara levissima, Tunis, Puton, Expl. sci. Tunisie, p. 23, n. sp.

HEMIPTERA-HOMOPTERA.

[Cf. Atkinson (13), Edwards (159), Löw (410), Signoret (660), Westwood (731); also *Aphididæ* and *Coccidæ*.]

CICADIDÆ.

The periodical *Cicada* in Indiana; Butl., Bull. Dep. Agric. Ent. No. 12, pp 24–31. *O. septendecim*, L., the periodical *Cicada* in South-eastern Indiana; Butl., P. Am. Ass. xxxiv, pp. 328 & 329: The song notes of; Riley, *op. eod.* pp. 330–332. *C. septendecim*, L., and race *tredecim*, Riley, development, varieties, food song, ravages, and their prevention, broods, &c.; Riley, Rep. 1885, pp. 233–258, pls. i, v, and vi, fig. 1. Observations on the periodical *Cicada*; Dim., J. Cincinnati. Soc. viii, pp. 233 & 234. *Cicada*, vocal organs of; Haswell, P. Linn. Soc. N.S.W. (2) i, p. 489.

Proarna capistrata, Dist., fig. 4, *pulverea*, Ol., fig. 5, figured; Waterh., Aid, pl. 168.

Tympanoterpes elegans, fig. 2, *arechavaleta*, Berg., fig. 3, figured; Waterh., Aid, pl. 168.

Carineta obtusa, Walk., figured; Waterh., Aid, pl. 168, fig. 1.

Platypleura capensis, sound-producing apparatus of; Morgan, Nature, xxxiii, p. 368.

FULGORIDÆ.

Pochazia cristata, Madagascar, Sign., Ann. Soc. Ent. Fr. (6) vi, p. 30, n. sp.

Pyrops tenebrosus, F., *flammea*, L., *madagascariensis*, Sign., to be united; Sign., Ann. Soc. Ent. Fr. (6) vi, p. 27.

Dictyophara walkeri, = (*pallida*, Walk, *nec* Don.), Atk., J. A. S. B. lv, p. 29, n. sp.

Eurybregma nigrolineata, ♀ described; Scott, Ent. M. M. xxiii, p. 106.

Fulgora laternaria noticed; Bull. Soc. Ent. Fr. (6) vi, p. c.

MEMBRACIDÆ.

Ceresa bubalus, Say, habits and metamorphoses; Jack, Canad. Ent. xviii, pp. 51–54.

Machærota guttigera, Ceylon, Westd., Tr. E. Soc. 1886, p. 332, pl. viii, n. sp.

IASSIDÆ.

Idiocerus viduatus, England, Edw., Tr. E. Soc. 1886, p. 118, n. sp.

Celidia, Germ. This name to be used in place of *Janus*, Fab.; Sign., Ann. Soc. Ent. Fr. (6) vi, p. 29.

C. cambouei, Madagascar, Sign., Ann. Soc. Ent. Fr. (6) vi, p. 29, n. sp.

Selenocephalus sulcifrons, Madagascar, Sign., Ann. Soc. Ent. Fr. (6) vi, p. 29, n. sp.

Thamnotettix apicatus, Tunis, Leth., Puton, Expl. sci. Tunisie, p. 24, n. sp.

PSYLLIDÆ.

Summary of Witlaczil's 1885 paper on anatomy of *Psyllidæ*; J. R. Micr. Soc. (2) vi, pp. 431-433: also Macloskie, Am. Nat. xx, pp. 283-287.

Aphalara calthæ, L., variation noticed, n. var. *maculipennis* described and figured, pl. vi, fig. 1; *A. picta* noticed: Löw, Verh. z.-b. Wien, xxxvi, pp. 149 & 150.

Psylla chlorostigma, Finland, p. 153, pl. vi, fig. 11, n. sp.; *P. albipes*, Flor., described, p. 152; *P. pyri* and other species found on the pear-tree, noticed and discriminated, pp. 154-157; *P. ledi*, Flor., ♂ described, p. 157: Löw, Verh. z. b. Wien, xxxvi. *P. mali*, Sch., nymph described; Scott, Ent. M. M. xxii, p. 281.

Psyllopsis frazinicola, nymph described; Scott, Ent. M. M. xxii, p. 281.

Amblyrhina maculata, Hungary, Löw, Verh. z.-b. Wien, xxxvi, p. 157, pl. vi, figs. 2 & 3, n. sp.

Floria vicina, Carinthia, Löw, Verh. z.-b. Wien, xxxvi, p. 159, n. sp.

Trioza trisignata, n. n. for *T. tripunctata*, Löw, p. 163; *T. centranthi*, Vall., noticed, p. 164, pl. vi, fig. 12, = (*acutipennis*, Förster), p. 165; *alacris*, Flor., *cirsii*, Lw., *viridula*, Zett., *rumicis*, Lw., *munda*, Förster, noticed, pp. 166-169: Löw, Verh. z.-b. Wien, xxxvi. *T. remota*, note on, description of nymph; Scott, Ent. M. M. xxii, p. 282.

Carsidara dugèsii, Mexico, Löw, Verh. z.-b. Wien, xxxvi, p. 160, pl. v, figs. 4-10, n. sp.

APHIDIDÆ.

[Cf. Buckton (89), Kessler (345), Lichtenstein (401, 402), Oestland (495), Trimen (705), Witlaczil (745).]

Trophi of *Aphides*; Witlaczil (744).

Review by Graells of Lichtenstein's work on *Aphididæ*; Rev. prog. ci. xxi, pp. 48-57.

Biology of *Aphididæ*, note on; Westhoff, JB. westf. Ver. 1885, p. 25.

Glaser, L. Die Blattlaustheorie von J. Lichtenstein in Montpellier; Ent. Nachr. xii, pp. 229-240.

Siphonophora pisi, Kalt., ravages of; Orm., Rep. ix, pp. 62 & 63.

S. frigida, p. 20, *chrysanthemi*, p. 22, *ludoviciana*, p. 23, *corydalis*, p. 25, *adianti*, p. 26, Minnesota, Oest., Rep. Surv. Minn. xiv, n. spp.

Macrosiphum, n. g., near *Siphonophora*, for *M. rubicola*, Minnesota, n. sp., Oest., Rep. Surv. Minn. xiv, p. 27.

Rhopalosiphum sonchi, nabali, Minnesota, Oest., Rep. Surv. Minn. xiv, p. 34, n. spp.

Myzus malvæ, Minnesota, Oest., Rep. Surv. Minn. xiv, p. 30, n. sp.

Aphis rumicis, L., pp. 1-5; *A. (Siphonophora) granaria*, Kirb., pp. 14-19; *A. brassicæ*, L., &c., pp. 39 & 40, ravages, &c., Orm., Rep. ix; *A. humuli*, ravages; *id. op. cit.* x, pp. 52-54. *A. rumicis* destructive to mangold-wurtzel; itself destroyed by a fungus: Houghton, Ann. N. H.

(5) xviii, pp. 1-4. *A. brassicæ*, L., sexual forms and egg noticed; Bull. Soc. Ent. Fr. (6) vi, p. xxx. *A. maidis*, Fitch, life-history; Garman, Ent. Am. ii, pp. 175-177. *A. rosæ*, L.; Kessler (345).

Aphis crithmi, S. England, Buckton, Tr. E. Soc. 1886, p. 323, pl. iv; *A. tamaricis* (France?), Licht., Bull. Soc. Ent. Fr. (6) v, p. clxxix; *A. frondosæ*, *ageratoidis*, p. 38, *eupatorii*, p. 39, *marutæ*, p. 40, *ripariæ*, p. 41, *polanisiæ*, p. 42, *annuæ*, p. 43, *phragmitidicola*, p. 44, *frigidaæ*, p. 46, Minnesota, Oest., Rep. Surv. Minn. xiv : n. spp.

Siphocoryne xanthii, *archangelicæ*, Minnesota, Oest., Rep. Surv. Minn. xiv, p. 36, n. spp.

Chaitophorus aceris and *C. populi*, date of hatching of eggs of; Bull. Soc. Ent. Fr. (6) vi, p. xxx.

Chaitophorus nigra, *spinosa*, Minnesota, Oest., Rep. Surv. Minn. xiv, p. 49, n. spp.

Lachnus pini, ♀ ♀ figured, pl. v, winged viviparous ♀ described, p. 324; Buckton, Tr. E. Soc. 1886.

Schizoneura (artemisiæ) karschii, Germany?, Licht., Ent. Nachr. xii, p. 82, n. sp.

Löwia, n. subg. (treated as genus) of *Schizoneura*, for *S. passerinii*, Sign.; Licht., Mon. Puc. peup. p. 37.

Pemphigus spiriformis, p. 29, *protospiræ*, p. 31, Europe, Licht., Mon. Puc. peup., n. spp.

Bucktonia, n. subg. (treated as genus) of *Pemphigus*, pp. 16 & 17, for *P. affinis*, Kalt.

Kessleria, n. subg. (treated as genus) of *Pemphigus*, p. 16; Licht., Mon. Puc. peup.

Tychea radicola, Minnesota, Oest., Rep. Surv. Minn. xiv, p. 56, n. sp.

Thelaxes and *Vucuna* discussed; Buckt., Tr. E. Soc. 1886, p. 325.

T. betulina, S.E. England, Buckt., Tr. E. Soc. 1886, p. 326, pl. vi, n. sp.

Chermes abietis, *Phylloxera quercus*, *vastatrix*, anatomy; Witlaczil (745). *C. viridis*, *laricis*, *abietis*, observations on development of; Glaser, Ent. Nachr. xii, pp. 247-250. *C. fagi* noticed; CB. Ver. Rheinal. xliii, p. 65.

C. taxi, England, Buckt., Tr. E. Soc. 1886, p. 327, pl. vii, n. sp.

Mastopoda, n. g. (anomalous), p. 52, for *M. pteridis*, n. sp., Minnesota, p. 53, on fronds of *Pteris aquilina*; Oest., Rep. Surv. Minn. xiv.

Phylloxera, Delamotte (135), Thomas (696): digestive apparatus of; Lemoine (395): parthenogenesis; Boiteau (60). *Bericht über die Verbreitung der Reblaus in Oesterreich, 1883 & 1884 (cf. Zool. Anz. ix, p. 123). At Cape of Good Hope; Trimen (705) and Le Nat. viii, p. 295. "Jelentés az országos phylloxera kísérleti állomás 1885, évi működéséről, 1886, 80 pp.; cf. Rov. Lapok, iii, p. 175.

COCCIDÆ and ALEURODIDÆ.

[Cf. Atkinson (14), Douglas (150), Göldi (249), List (405, 406), Trimen (704), Witlaczil (745).]

Lecanium, *Coccus* sp.? (on *Loranthus*), injurious species in Ceylon noticed; P. A. S. B. lv, p. 121.

Aspidiotus nerii, development, organisation, metamorphoses, and habits; Lemoine, Bull. Soc. Ent. Fr. (6) vi, p. exci: anatomy and metamorphoses;

Lemoine (396) : Lemoine's observations on noticed ; Bull. Soc. Ent. Fr. (6) vi, p. lxxiii. *A. zonatus*, *Leucaspis pini*, anatomy, metamorphoses ; Wiltaczil (746). *A. zonatus*, Frf., and *nerii*, Bouché, noticed ; Dougl., Ent. M. M. xxiii, p. 150.

Mytilaspis pomorum, Bouché, *flavescens*, Targ.-Tozz., *citricola*, Comst., noticed ; Dougl., Ent. M. M. xxii, p. 249, and xxiii, p. 27 ; also *M. linearis*, Geof. ; *id. loc. cit.*

M. ulicis, S. England, Dougl., Ent. M. M. xxii, p. 249, and xxiii, p. 152 ; *M. vitis* (Goethe), Europe, *id. op. cit.* xxiii, p. 28 : n. spp.

Asterodiaspis quercicola noticed ; Dougl., Ent. M. M. xxii, p. 250.

Pulvinaria camellicola, Sign., noticed ; Dougl., Ent. M. M. xxiii, p. 81.

Lecanium oleæ, ravages of ; Bull. Dep. Agric. Ent. No. 12, pp. 34-36. *L. tilia*, Fitch, function of its secretion ; Cook, Ent. Am. i, p. 211. *L. hibernaculorum*, Boisd., *hemisphaericum*, Targ.-Tozz., *ulmi*, L., *alni*, Modeer, noticed ; Dougl., Ent. M. M. xxiii, pp. 77-81. *L. cerasi* and *variegatum* (Goethe), England, *id. op. cit.* xxii, p. 28 ; *alienum*, England, on *Asplenium bulbiferum*, *id. t. c.* p. 77 : n. spp.

Lecanopsis (or *Lecanodipsis*) *dugesii*, Mexico, Licht. & Sign., Bull. Soc. Ent. Fr. (6) vi, p. xxxix, n. sp.

Ceroplastes rusci destroyed by *Erastria scitula* ; Bull. Soc. Ent. Fr. (6) vi, p. cxxxiv.

Tachardia, n. n. in place of *Oarteria*, Comst. (præocc. in *Protozoa*) ; Sign., Bull. Soc. Ent. Fr. (6) vi, p. lxii.

Kermes aurantii, Boisd., *Parlatoria zizyphi*, Luc., and *P. lucasii*, Targ., are all one species ; Sign., Bull. Soc. Ent. Fr. (6) vi, p. xxix.

Dactylopius destructor, Comst., noticed ; Dougl., Ent. M. M. xxiii, p. 154.

Pseudococcus fagi, Baersp., discussion on ; Dougl., Ent. M. M. xxiii, p. 152.

Coccus lacca, early Greek nomenclature ; Ball, (23) p. 331.

Margarodes (? *Porphyrophora*), cf. Trimen (704).

Orthezia cataphracta, Shaw ; List (405, 406) : noticed ; Zool. Anz. ix, pp. 190 & 371.

Dorthesia urticae, recorded from Brazil ; ♂ discussed, and head (destitute of rostrum) figured : Göldi, MT. schw. ent. Ges. vii, pp. 250-255.

Aleurodes vaporariorum, note on ; Dougl., Ent. M. M. xxiii, p. 164.

A. prolella, L., Ravages of ; Orm., Rep. ix, pp. 10 & 11.

A. filicium, p. 247, *goyabæ*, p. 248, *aëpim*, p. 250, Rio Janeiro, Göldi, MT. schw. ent. Ges. vii, n. spp.

(ANOPLURA.)

Hamatopinus breviceps (on *Cephalophus maxwelli*), p. 142, pl. xv, fig. 5, *setosus* (on *Xerus getulus*), p. 143, pl. xv, fig. 6, *ungulatus* (on *Cephalophus nigrifrons*), p. 144, pl. xv, fig. 7, Piaget, les Pédiculines, Supp., n. spp.

H. tenuirostris, Burm., described and figured, p. 145, pl. xv, fig. 8, *ventricosus*, Denny, p. 146, p. xvi, fig. 9, *tuberculatus* var. *penicillata* (sic), noticed, p. 147 ; Piaget, Les Pédiculines, Supp.

Echinophthirius groenlandicus, on *Phoca groenlandica*, at Jan Mayen ; Becher, Ins. Jan. Mayen, p. 60, pl. v, figs. 1, 1a-d, n. sp.

(F). *NEUROPTERA*.

Fauna of Switzerland, Schoch (641). Formation of egg, Stuhlmann (690). Spermatozoa, Gilson (243.)

TRICHOPTERA.

[Cf. McLachlan (415), Wallengren (720).]

Wing-neuration of; Redtenbacher, (581) pp. 197 & 198, pls. xv pt. & xvi pt.

Apataniidæ.

The Scandinavian species of, with *Apatelia*, n. subg., and *Apatania inornata*, Lapland, n. sp., p. 78; Wallengr., Ent. Tidskr. 1886, pp. 77-80.

Limnophilidæ.

Drusus annulatus and *Peltostomis sudetica* noticed; McLach., Rev. d'Ent. v, p. 127.

Sericostomatidæ.

Sericostoma turbatum and *timidum* noticed; McLach., Rev. d'Ent. v, p. 128.

Crunæcia irrorata, Curt., larva, cases, habits; Morton, Ent. M. M. xxiii, pp. 146 & 147.

Leptoceridæ.

Adicella filicornis, habits, cases, noticed; Ent. M. M. xxiii, p. 149.

Beræa pullata, Curt., larva and case described; Mort., Ent. M. M. xxiii, p. 148.

Hydroptilidæ.

Agraylea multipunctata, Curt., on the case, &c., of; Mort., Ent. M. M. xxii, pp. 269-272.

Oxyethira costalis, Curt., case of; McLach., Ent. M. M. xxiii, p. 17.

Metamorphosis of a species unnamed; Hudson, Tr. N. Z. Inst. xviii, p. 213, pl. ix.

NEUROPTERA-PLANIPENNIA.

Neuroptera, "s. str.," wing-neuration of; Redtenbacher, (581) pp. 191-196, pls. xiv & xv.

Panorpidæ.

The group to be an order with the name *Mecaptera* ; Packard (513).

Panorpate, wing-neuration of ; Redtenbacher, (581) pp. 196 & 197, pl. xv pt.

Myrmeleonidæ.

Stiphoneura, n. g., for *Myrmeleon inclusus*, Walk. ; Gerst., MT. Vorpomm. xvi, p. 91.

Panexis, pigmentation of wings of ; McLach., Ent. M. M. xxii, p. 216.

Nemopteridæ.

Monograph, Hagen (272).

Stenorrhacus, n. n. for *Stenotenia*, McLach. ; McLach., P. E. Soc. 1886, p. lviii.

Nemoptera lusitanica (synonymy), *huttii*, and *imperatrix*, note on ; McLach., P. E. Soc. 1886, p. lviii.

Nemoptera gracilis, Cape Town, Hagen, P. Bost. Soc. xxiii, p. 255, n. sp.

Mantispidæ.

Mantispa styriaca, habits, and occurrence at Fontainebleau ; Bull. Soc. Ent. Fr. (6) vi, p. cxxxiii.

Hemerobiidæ.

On the existence of "scales" on the wings of the Neuropterous genus *Isoclipteron*, Costa ; McLach., Ent. M. M. xxii, p. 215.

Hemerobius nervosus, Fab., *Anacharis ensifera* and *typica*, Walk., are parasites of ; Handlirsch, Verh. z.-b. Wien, xxxvi, p. 235. *H. (Psectra) dipterus*, Burm., = (*delicatulus*, Fitch), remarks on the species ; Hagen, Ent. Am. ii, pp. 21-24.

Megalomus conspersus, Switzerland, Schoch, Neur. Helv. p. 33, n. sp. ; but, p. 92, to be deleted, as it is *M. algidus*, Er.

Micromus aphidivorus, Schrk., noticed ; McLach., Ent. M. M. xxiii, p. 138.

Chrysopidæ.

Chrysopa ventralis, *prasina*, *abdominalis*, *aspersa*, and *zelleri*, specific characters and variation discussed at length ; McLach., Ent. M. M. xxiii, pp. 33-36. *C. septempunctata*, variation ; *id. t. c.* pp. 36-38.

PSEUDO-NEUROPTERA.

THYSANURA.

[*Cf.* Becher (38), Dubois (152), Grassi (256, 257, 258), Packard (517), Poppe (557), Tömösváry (702) ; and for fossil, Scudder (650).]

Smynthurus maculatus, Hungary, Tömös., Math. term. Köz. xix, p. 49 ; *S. hessei*, Congo, Poppe, Abh. Ver. Brem. ix, p. 320 : n. spp.

Japyx : the European species discussed and reduced to *solifugus*, with varr. *wollastoni*, *humbertii*, and *major*, and *isabellæ*, Sicily, n. sp. ;

Grassi, Atti. Acc. Gioen. xx, pp. 1-13. *J. saussurii*, Humb., note on ; Packd., Am. Nat. xx, p. 382.

Lipura armata, note on its photogenic powers ; Dubois (152).

Campodea : the European species discussed and reduced to *C. staphylinus* ; Grassi, Atti Acc. Gioen. xix, pp. 33-40.

C. mexicana, Mexico, Packd., Am. Nat. xx, p. 383, n. sp.

Lepisma, ravages of species of in libraries ; Hagen, Canad. Ent. xviii, pp. 221-230.

Machilis, anatomy, affinities, phylogeny ; Grassi (257).

Nicoletia, anatomy of ; Grassi (258).

MALLOPHAGA.

[Cf. Becher (38), Kolbe (359).]

Grosse's classification and structure of the bird-lice or *Mallophaga*. Abstract by G. Macloskie, Am. Nat. xx, pp. 340-348, and J. Micr. & Nat. Sci. vi, pp. 159-167, pl. xx.

Tetrophthalmus, summary of Grosse on anatomy of ; J. R. Micr. Soc. (2) vi, pp. 64 & 65.

Platysyllus, suggestion that this may belong to *Mallophaga* ; Kolbe, B. E. Z. xxx, p. 93, et seq.

THYSANOPTERA.

Thrips consociata, Sicily, Targ.-Tozz., Bull. Ent. Ital. 1886, p. 425, n. sp.

Heliothrips adonidum, Hal., ? the same as *H. hæmorrhoidalis* ; Cam., P. N. H. Soc. Glasg. (n.s.) i, p. 301.

TERMITIDÆ.

Platyptera, Packard : Packard (513) now restricts his order of this name to the *Termites* and *Mallophaga*.

Termes : early Greek nomenclature ; Ball, (23) p. 330. *T. lucifugus* at Agen, in France, living in stems of vine ; Laboulbène, Bull. Soc. Ent. Fr. (6) vi, p. lii.

PSOCIDÆ.

[Cf. Aaron (1).]

Corrodentia (including *Mallophaga*, *Termitidæ*, *Psocidæ*), wing-neuration of ; Redtenbacher, (581) pp. 183 & 184, pl. xii, pt.

Structure of wings in *Psocus* (and *Odonata*) ; Hagen, Wien. ent. Z. v, pp. 311 & 312.

Kolbe, H. J. Zwei merkwürdige und unbekannte Nymphen von Psociden ; JB. westf. Ver. 1885, pp. 59-61, pl. iii, figs. 4 & 5.

Elipsocus abietis, *hyalinus*, and *westwoodi*, synonymy discussed ; McLach., Rev. d'Ent. v, p. 133.

Echmepteryx, n. g., near *Amphientomum*, for *E. agilis*, n. sp., Pennsylvania ; Aaron, P. Ac. Philad. 1886, p. 17.

Cacilius subflavus, *nubilus*, pl. i, fig. 3, p. 13, Texas, *impacatus*, Philadelphia, p. 14, Aaron, P. Ac. Philad. 1886, n. spp.

Psocus campestris, Texas, p. 15, *leidyi*, N. America, p. 15, pl. i, fig. 2, *texanus*, with var. *submarginatus*, pl. i, fig. 1, Texas, p. 16, Aaron, P. Ac. Philad. 1886, n. spp.

PERLIDÆ.

[*Cf.* McLachlan (414).]

Perlida, neururation of, note on ; McLach., Tijdschr. Ent. xxix, p. 158.

Plecoptera, wing-neururation of ; Redtenbacher, (581) pp. 169-171, pl. x, pt.

Chloroperla capnoptera, Turkestan, McLach., Tijdschr. Ent. xxix, p. 157; *helvetica*, Switzerland, Schoch, Neur. helv. p. 92 : n. spp.

Diamphipnoa virescentipennis, Blch., 1851, = (*annulata*, Brauer, 1869, = *lichenalis*, Gerst., 1873) ; McLach., Ent. M. M. xxii, p. 215.

EPHEMERIDÆ.

Wing-neururation ; Redtenbacher, (581) pp. 165 & 166, pl. ix, pt.

Ephemerida to be an order with the name *Plectoptera* ; Packard (513).

ODONATA.

[*Cf.* Kirby (351), McLachlan (414), Roster (618), Selys (651, 652).]

Wing-neururation ; Redtenbacher, (581) pp. 166-169, pl. ix, pt.

Les *Odonates* du département de l'Indre ; Martin, Rev. d'Ent. v, pp. 231-251. Records 63 species, and contains many observations on habits and times of appearance.

Libellulina.

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ECHINODERMATA.

BY

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53. STÜRTZ, B. Beitrag zur Kenntniss paläozoischer Seesterne. *Paläontogr.* xxxii, pp. 75-98, pls. viii-xiv.
54. THÉEL, H. Report on the *Holothurioidea* dredged by H.M.S. 'Challenger' during the years 1873-76. *Chall. Rep. Zool.* No. xxxix, 290 pp., 16 pls.
55. —. Reports on the Results of Dredging, &c. Report on the *Holothurioidea*. *Bull. Mus. C. Z.* xiii, pp. 1-21, 1 pl.
56. WACHSMUTH, C., & SPRINGER, F. Revision of the *Palæocrinoidea*. Part III, Section ii. *J. Ac. Philad.* 1886, pp. 64-227.
57. WACHSMUTH, C. On a New Genus and Species of Blastoids, with observations upon the Structure of the Basal Plates in *Codaster* and *Pentremites*. *P. Davenport Ac.* iv, pp. 76-87.
58. —. Description of a New Crinoid from the Hamilton Group of Michigan. *T. c.* pp. 95-97.
59. WALTHER, J. Untersuchungen über den Bau der Crinoiden mit besonderer Berücksichtigung der Formen aus dem Solenhofener Schiefer und dem Kelheimer Diceraskalk. *Paläontogr.* xxxii, pp. 155-200, pls. xxiii-xxvi.

GEOGRAPHICAL DISTRIBUTION.

Echinoderms from "warm area" of Færoe Channel, J. Murray. *P. Phil. Soc. Glasg.* xvii, pp. 322 & 323; from "cold area," pp. 327 & 328.

Arctic *Comatulæ*: Carpenter (10).

Jan Mayen: Fischer (26).

Behring's Sea: Ludwig (37).

Tromsø and West Fiumark: Aurivillius, *Bih. Sv. Ak. Handl.* xi, No. 4, pp. 47-51.

Liverpool Bay: Herdman (29); Chadwick (12).

South-west of Ireland: Haddon and Bell, *P. R. Irish Ac.* (2) iv, pp. 618-621.

Caribbean Sea: *Holothurians*, Théel (55).

- Mahou, Minorca : Braun, SB. Nat. Ges. Dorp. vii, pp. 307-310.
 Channel Islands : Koehler, Ann. Sci. Nat. (6) xx, Art. 4, and Ann.
 N. H. (5), pp. 229, 290, & 350,
 Ceylon, Bell (6).
 Mergui Archipelago : Holothurians, Bell (8).
 South Georgia : Holothurians, Lampert (35).
 Challenger, Voyage of : Holothurians, Théel (54).
 Vittor Pisani, Voyage of : Ludwig (38).
 Deep Sea forms : Perrier (41).

ANATOMY, PHYSIOLOGY, AND DEVELOPMENT.

Preyer (44) has published the first part of a most important and interesting essay on the movements of Echinoderms. Experiments made with an Ophiurid gave evidence of the possession of a power to adapt itself to new situations, and appear to justify the application to it of the term intelligent; the curious righting movements are referred to the "muscular sense," just as in the case of the frog: the effects of stimulation and the extent of irradiation were carefully investigated, and the work justifies its title of a "Comparative Physiological-psychological Investigation." The nervous system of *Echinus acutus* has been investigated by Prouho (45), who confirms the results of Lovén on the peripheral nervous system of *Brissopsis*. The innervation of pedicellariæ has been studied by Hamann (28.4).

The vascular system has attracted many workers. Koehler (33) on Echinoids generally; Prouho (46) on *Dorocidaris papillata*, and (47) *Spatangus purpureus*; Cuénot (17) on Asteridæ, and Koehler, (34) on Ophiurids.

Hamann (28.2) and Beddard [Ann. N. H. (5) xvii, pp. 428-430] treat of the striated muscles of Echinoids; and the former (28.1) describes some special glandular organs in *Sphærechinus granularis*, which he calls globifers. The Sarasins (52) describes the poison-apparatus of *Cyanosoma urens*, g. & n. sp, which consists of modified spines.

The development of *Comatula* has been studied by Barrois (4 & 5), and that of *Ophiopholis* and *Echinarachnius* by Fewkes (25); Perrier (42) mentions a new *Asterias*—*A. hyadesi*—in which the young are attached to the mother by a prolongation of the buccal membrane.

Regeneration in *Antedon* : Dendy (18).

Hæmatoporphyrin in the integument of *Asterias rubens* : C. A. MacMunn. J. Physiol. vii, p. 242. Colouring matter of *Solaster papposus*, *id. t. c. p.* 244.

In a popular account of deep sea Echinoderms, Perrier (41, pp. 258-287) figures the following new or recently described species :—

Stephanaster bourgueti, *Cuulaster pedunculatus* ;

Democrinus parfaiiti, *Ilyocrinus recuperatus*, *Eudiocrinus atlanticus* ;
Pschychropotes buglossa, *Siphonothuria incurvata*, *Ypsilothuria attenuata*,
Y. talismani, and *Rhopalodina heurteli*.

GENERA AND SPECIES.

ECHINOIDEA.

Cidaris buchi; Döderlein (20).

Cyanosoma, n. g., allied to *Asthenosoma*, for *C. urens*, n. sp., Ceylon; Sarasins (52).

The *Echinocardium* described by Bell (7), is *E. pennatifidum*, Norman.

Discoidea cylindrica: anatomy; Duncan & Sladen (22).

Among the fossil Echinoids described by Duncan and Sladen, *Temno-pleurus simplex*, p. 375, *Clypeaster suffarcinatus*, p. 376, and *Laganum tumidum*, p. 379, are new; (23).

Gauthier (C.R. Ass. Fr. Sci. xiv, 2, pp. 356-362) describes as new *Micraster sanctæ mauræ*, *M. beonensis*, and *Epiaster renati*, from the chalk.

Coraster, n. g., allied to *Ovulaster*, for *C. vilanovæ*, n. sp. (Eocene), p. 710;

Ornithaster, n. g., near preceding, for *O. evaristei*, n. sp. (Eocene), p. 711;

Brissopneustes, n. g., rather near *Micraster*, for *B. vilanovæ*, n. sp. (Eocene), p. 713;

Microsoma, n. g., near *Cyphosoma*, for *C. croijleri*, Cotteau, p. 716;

Salenia janeti, n. sp., p. 716 ("Senonien Supérieur");

Cælopleurus rousseli, n. sp., p. 718 (Eocene), and notes on the genus;

Glyphocyphus atanensis, n. sp., p. 725 (Eocene);

Echinanthus meslei, n. sp., p. 726 (Miocene): Cotteau (14).

ASTEROIDEA.

Asterias cilicia; Compter, J. Z. Nat. xix, p. 764.

Ctenodiscus krausei, n. sp., Behring's Sea; Ludwig, (37) p. 290.

Pteraster aporus, n. sp., Behring's Sea; *id. t. c.* p. 293.

OPHIUROIDEA.

Ophioglypha maculata, n. sp., Emma Bay; Ludwig, (37) p. 283.

HOLOTHURIOIDEA.

Théel, in addition to revising the Holothurians generally, describes as new (54):—

Synapta picta (Bermuda), p. 10, *S. verrilli* (10° 30' S., 142° 18' E.), p. 12, *S. insolens* (9° 59' S., 139° 42' E.), *S. aculeata* (35° 11' N., 139° 28' E.), p. 13, *S. challengerii* (19° 6' S., 178° 14' 20" E.), *S. incerta*, Ludwig, var. *variabilis* (Japan), *S. abyssicola* (2° 42' S., 14° 41' W.), p. 14;

Ankyroderma danielsseni (51° 37' 30" S., 74° 3' W.), p. 39, *A. simile* (35° 11' N., 139° 28' E.), p. 40, *A. marenzelleri* (37° 34' S., 179° 22' E.), p. 41;

Trochostoma antarcticum (S. America), *T. albicans* (38° 34' N., 72° 10' W.), p. 44, *T. albicans* var. *glabra* (37° 34' S., 179° 22' E.), p. 46 ;

Cucumaria mirabilis (Zebu, Port Jackson), p. 61, *C. capensis* (C.G.H.), p. 62, *C. discolor* (Simon's Bay), p. 64, *C. mendax* (51° 40' S., 57° 50' W.), p. 65, *C. abyssorum* (46° 16' S., 48° 27' E.), p. 66, var. *grandis*, p. 67, var. *hyalina*, p. 68, *C. kerguelensis* (Kerguelen), p. 69, *C. insolens* (Simons' Bay), p. 70, *C. multipes* (Yokohama), p. 72, *C. serrata* (52° 4' S., 71° 22' E.), p. 73, varr. *intermedia* and *marionensis*, p. 74, *C. chronhjelmii* (Vancouver's Is.), p. 105, *C. vegae* (Behring Is.), p. 114 ;

Ocnus typicus (Hong Kong), p. 75 ;

Colochirus violaceus (11° 6' N., 123° 9' E.), p. 78, *C. challengerii* (10° 30' S., 142° 18' E.), p. 80, *C. pygmaeus* (Bahia), p. 83 ;

Psolus disciformis (52° 45' 30" S., 73° 46' W.), p. 85, *P. murrayi* (37° 17' S., 53° 52' W.), p. 85, *P. incertus* (Kerguelen), p. 86 ;

Thyone fusus var. *papuensis* (10° 30' S., 142° 18' E.), p. 92, *T. pervicax* (Bahia), p. 93, *T. recurvata* (Kerguelen), p. 94 ;

Thyonidium rugosum (Queen Charlotte Sound), p. 95 ;

Phyllophorus incomptus (Port Jackson), p. 97 ;

Pelopatides, n. g. (of *Aspidochirota*), for *P. confundens* (S. Pacific), p. 154, *P. aspera* (12° 21' N., 122° 15' E.), p. 157, *P. appendiculata* (34° 7' N., 138° 0' E.), p. 158 ;

Stichopus japonicus var. *typicus* (Japan), p. 161, *S. challengerii* (46° 53' S., 51° 52' E.), p. 163, *S. (?) torvus* (33° 42' S., 78° 18' W.), p. 164, *S. moseleyi* (Falkland Is.), p. 165, *S. sordidus* (Queen Charlotte Sound), p. 167 ;

Pseudostichopus, n. g., for *P. mollis* (Kerguelen, &c.), p. 169, *P. villosus* (numerous localities in Southern Seas), p. 170, var. *violaceus* (62° 26' S., 95° 44' E.), p. 172 ;

Holothuria minax (Japan), p. 173, *H. africana* (Simons' Bay), p. 174, *H. spinifera* (11° 37' N., 123° 31' E.), p. 175, *H. fusco-rubra* (Sandwich Is.), p. 182, *H. lactea* (37° 26' N., 25° 13' W., and 37° 34' S., 179° 22' E.), p. 183, *H. thomsoni* (34° 37' N., 140° 32' E., and 35° 22' N., 169° 53' E.), p. 184, var. *hyalina*, p. 185, *H. murrayi* (33° 42' S., 78° 18' W.), p. 185, var. *parva*, p. 186, and var. ? p. 187, *H. fusco-caerulea* (Tahiti), p. 211.

Muelleria flavo-castanea (Madeira), p. 198.

Théel (55) enumerates the Holothurians dredged by the Blake, Hassler, and other American Expeditions ; the new species are :—

Deima blakei, p. 1 ;

Benthodytes assimilis, p. 2 ;

Pelopatides agassizii, p. 3 ;

Stichopus pourtalesii, *S. johnsoni*, p. 4 ;

Echinocucumis asperrima, p. 10 ;

Thyone hassleri, p. 11 ;

Psolus tuberculosus, p. 13, *P. pourtalesii*, p. 14, *P. brazilensis*, p. 15 ;

Trochostoma blakei, p. 16, *T. arcticum*, Marenz., varr. *parva*, *caeruleum* [sic] n. n., p. 17.

Eucyclus, n. g. *Dendrochiro*t. for *E. duplicatus* (Peru); Lampert, Die Seewalzen, p. 290.

Caudina arenata, Gould, n. var. *armata*, p. 17;

Ankyroderma agassizii, p. 19.

Holothuria lamperti, Philippines, n. sp., Ludwig, (38) p. 6; *H. andersoni*, Mergui, n. sp., Bell, (8) p. 28.

Cucumaria forbesi, p. 26, *C. assimilis*, p. 27, Mergui, n. spp., Bell. t. c.; *C. planci*, von Marenz.; six-rayed varieties, Ludwig (39); *C. crocea*, formation of marsupial pouches described, Lampert, (35) p. 12; *C. pithacnion*, n. sp., *id.* p. 15; *C. pusilla*, n. sp., Emma Bay, Ludwig, (37) p. 279; *C. chiloensis*, Chiloe, *id.*, (38) p. 12; *C. chierchie*, Gulf of Panama, *id.* t. c. p. 13.

Semperia georgiana, n. sp., Lampert, (35) p. 16.

Thyone muricata, Studer, and *Chirodota purpurea*, characters discussed; *id.* p. 18.

Psolidium, n. g., for *P. dorsipes*, n. sp., Straits of Magellan, Ludwig, (37) p. 9.

Thyone belli, Abrolhos Reef, p. 21, *T. panamensis*, Gulf of Panama, p. 22, *T. similis*, Panama, p. 23, n. spp., *id.* t. c.

Chirodota pisanii, n. sp., Chonos Archipelago, *id.* p. 29.

Synapta orsinii, n. sp., Assab, *id.* p. 33.

CRINOIDEA.

On variations in the form of the cirri; Carpenter (9).

Antedon quadrata, n. n. for *A. celtica*, Marenzeller (*non* Barrett), p. 7; *A. barentsi*, n. sp., Carpenter, (10) p. 9.

De Loriol has published, pp. 1-144, pls. cxxii-clviii of vol. xi, part 2, of *Crinoides* (Terrain Jurassique) in Pal. Franc., dealing with *Cyclocrinus* and *Pentacrinus*.

P. H. Carpenter reviews M. de Loriol on Jurassic Crinoids, and Wachsmuth and Springer on the Revision of the *Palæocrinidea*, part iii; Ann. N. H. (5) xvii, pp. 276-289; and a continuation of the latter, *op. cit.* xviii, pp. 406-412.

For a valuable Morphological and Systematic Monograph of the Blastoidea, see ETHERIDGE & CARPENTER (24).

VERMES.

BY

PROFESSOR F. JEFFREY BELL, M.A., SEC. R.M.S.

GEOGRAPHICAL DISTRIBUTION AND FAUNAL LISTS.

- MARENZELLER gives a list of all the Worms found at Jan Mayen (30).
Worms from "warm area" of Færoe Channel; P. Phil. Soc. Glasg. xvii, pp. 323 & 324 : from "cold area," p. 329.
- GIBSON, R. J. HARVEY. Report on the *Vermes* of the L. M. B. C. District. Fauna of Liverpool Bay, i, 1886, pp. 144-160.
- Marine *Vermes* from the S.W. of Ireland; HADDON, P. R. Irish Ac. (2) iv, pp. 621 & 622 : of Channel Islands, KOEHLER, Ann. Sci. Nat. (6) xx, art. 4, and Ann. N. H. (5) xviii, pp. 229, 290, & 350.
- Freshwater Worms of Central Europe; IMHOF (19-21).
- Rhabdocœle fauna of Livonia; BRAUN, SB. Ges. Dorp. vii, pp. 359-361 : of Dorpat, *id. t. c.* pp. 318-320 : of Peipus, *id. t. c.* pp. 333-335.
- Castrada*, Livonian species; BRAUN, SB. Ges. Dorp. vii, pp. 341 & 342.
- Turbellaria* of Lesina; GRAFF (13).
- Nemerteans of Roscoff; CHAPUIS (6).
- Nematodes of North Sea; DE MAN (48).
- Rotifers of Great Britain; HUDSON & GOSSE (60).
- Pelagic Annelids: of Atlantic, LEVINSEN (101); of Mediterranean, VIGUIER (120).
- Earthworms of Australia; FLETCHER (89).
- Leeches of Japan; WHITMAN (123).

PLATYHELMINTHES.

1. BELL, F. J. Note on *Bipalium kewense* and the Generic Characters of Land Planarians. P. Z. S. 1886, pp. 166-168, pl. xviii. [See also Gard. Chron. (n.s.) xxv, p. 338, and Salvin, P. Z. S. 1886, p. 205.]

2. BENEDEN, E. VAN. Sur la présence en Belgique du *Bothriocephalus latus*, Bremser. Bull. Ac. Belg. Iv, pp. 265-280.
3. BLANCHARD, R. Notices helminthologiques. Bull. Soc. Zool. Fr. xi, pp. 294-304, pl. x.
4. BÖHMIG, L. Untersuchungen über rhabdocöle Turbellarien. Z. wiss. Zool. xliii, pp. 290-328, pls. xi-xxii.
5. BROCK, J. *Euryœalum sluiteri*, n. g. & sp. [Prel. notice.] Nachr. Ges. Götting. 1886, pp. 543-547.
6. CHAPUIS, F. Note sur quelques Némertes récoltées à Roscoff dans le courant du mois d'Aout, 1885. Arch. Z. expér. pp. xxi-xxiv.
7. DELAGE, Y. Etudes histologiques sur les Planaires rhabdocœles acœles. Arch. Z. expér (2) iv, pp. 109-160, pls. v & vi.
8. DU PLESSIS, G. Étude sur les Monotides d'eau douce considérés comme les survivants d'une ancienne faune marine. Bull. Soc. Vaud. xxi, pp. 265-273, pl. vii.
9. FRANÇOIS, P. Sur le *Syndesmis*, nouveau type de Turbellariés décrit par M. W. A. Silliman. C.R. ciii, pp. 755-757.
10. FRITSCH, G. Die Parasiten des Zitterwelsen. SB. Ak. Berlin, 1886, pp. 99-108, pl. i.
11. °GENERALI, G. A proposito di un caso di *Cysticercus bovis*. Rassegna di Sc. med. i, No. 5. [Cf. Zool. Anz. ix, p. 610.]
12. GIARD, A. Sur un Rhabdocèle nouveau parasite et nidulant (*Fecampia erythrocephala*). C.R. ciii, pp. 499-501. [Ann. N. H. (5) xviii, p. 321.]
13. GRAFF, L. Turbellarien von Lesina. Zool. Anz. ix, pp. 338-342.
14. °GRASSI, B. Ulteriori particolari intorno alla *Tenia nana*. Gaz. degli Ospitali 1886, No. 78. [Cf. Zool. Anz. x, p. 73.]
15. HALLEZ, P. Sur un nouvel organe des sens du *Mesostoma lingua*, O. S. C.R. cii, pp. 684-686.
16. HANNOVER, A. Quelques remarques sur le *Cysticercus cellulosæ* dans le cerveau de l'homme. [Cf. J. de l'Anat. Phys. xxii, pp. 508-514.]
HOYLE, W. E. [See LEUCKART.]
17. HUBRECHT, A. A. W. Contributions to the Embryology of the *Nemertea*. Q. J. Micr. Sci. xxvi, pp. 417-448, pl. xxii.
18. IJIMA, I. Notes on *Distoma endemicum*, Baelz. J. Coll. Sci. Imp. Univ. Japan, 1, i, pp. 47-59, pl. vii.
19. IMHOF, O. E. Neue Resultate über die pelagische und Tiefsee-Fauna einiger in Flussgebiet der Po gelegener Süßwasserbecken. Zool. Anz. ix, pp. 41-47.
20. —. Vorläufige Notizen über die horizontale und verticale geographische Verbreitung der pelagischen Fauna de Süßwasserbecken. T. c. pp. 335-338.

21. [IMHOF, O. E.] Ueber mikroskopische pelagische Thiere aus der Ostsee. *T. c.* pp. 612-615.
22. JAWOROWSKI, A. Vorläufige Ergebnisse als Beitrag zur Kenntniss und Anatomie von *Mesostoma personatum*. *Zool. Anz.* ix, pp. 83-85.
23. KOEHLER, R. Contribution à l'histoire naturelle des Orthonectides. *C.R.* ciii, pp. 609-610.
24. KOROTNEFF, A. *Ctenoplana kowalevskii*. *Z. wiss. Zool.* xliii, pp. 242-251, pl. viii.
25. KÜCHENMEISTER, F. Die Finne des *Bothriocephalus* und ihre Uebertragung auf dem Menschen. Leipzig: 1886, 8vo, 44 pp.
26. LACAZE-DUTHIERS, H. DE. Contribution à l'histoire du Phénicure. *Arch. Z. expér.* (2) iv, pp. 77-108, pls. iv & iv bis.
27. LEUCKART, R. Die Parasiten des Menschen und die von Ihnen herrührenden Krankheiten. 1^{er} Bandes, 1^{re} Abth. Leipzig & Heidelberg: pp. 850-1000, title-page, table of contents (xxxi pp.). 2^{er} Bandes, 2^e Abth.: 1886, pp. 1-96.
28. —. The Parasites of Man, and the Diseases which Proceed from them. Translated, &c., by W. E. Hoyle. Natural History of Parasites in General. Systematic Account of the Parasites infesting Man. *Protozoa and Cestoda*. Edinburgh: 1886, xxvi & 771 pp.
29. LINSTOW, O. VON. Helminthologische Beobachtungen. *Arch. f. Nat.* lii, pp. 113-138, pls. vi-ix.
30. MARENZELLER, E. VON. Poriferen, Anthozoen, Ctenophoren, und Würmer von Jan Mayen gesammelt von Dr. F. Fischer. 16 pp., 1 pl. (Separate copy from Die internat. Polarforschung, 1882-83. Die Österreich. Polarstation Jan Mayen, iii Band.)
31. MONIEZ, R. Description du *Distoma ingens*, n. sp., et remarques sur quelques points de l'anatomie et de l'histologie des Trématodes. *Bull. Soc. Zool. Fr.* xi, pp. 531-543, pl. xv.
32. NIEMIEC, J. Untersuchungen über das Nervensystem der Cestoden. *Arb. z. Inst. Wien*, vii, pp. 1-60, pls. i & ii.
33. PARONA, E. Il *Bothriocephalus latus* (Bremser) in Lombardia. *Estr. Rendic. Istit. Lombard.* (2) xix, 10 pp. [*Cf.* *Zool. Anz.* ix, p. 609.]
34. PIESBERGEN, F. Die Ekto- und Entoparasiten von welchen die in der Umgebung von Tübingen lebenden Fische bewohnt werden. *J.H. Ver. Württ.* xlii, pp. 73-88, pl. ii.
35. POIRIER, J. Appareil excréteur et système nerveux du *Duthiersia expansa*, E. P., et du *Solenophorus megalcephalus*, Creplin. *C.R.* cii, pp. 700-703.
36. —. Sur les *Diplostomidæ*. *Arch. Z. expér.* (2) iv, pp. 327-346, pls. xviii-xx.
37. —. Trématodes nouveaux ou peu connus. *Bull. Soc. Philom.* (7) x, pp. 20-40, pls. i-iv.

38. SALENSKY, W. Bau und Metamorphose des *Pilidium*. Z. wiss. Zool. xliii, pp. 481-511, pls. xviii & xix.
39. *SCHÖNE, O. Beitrag zur Statistik der Entozoen im Hunde. Leipzig : 1886, 24 pp. [Cf. Zool. Anz. x, p. 53.]
40. SEKERA, E. Ergebnisse meiner Studien aus *Derostoma typhlops*, Vejd. Zool. Anz. ix, pp. 566-570.
41. *STOSSICH, M. I Distomi dei Pesci marini e d'acqua dolce. Trieste : 1886, 66 pp. [Cf. Zool. Anz. ix, p. 610.]
42. WELDON, W. F. R. On *Dinophilus gigas*. Q. J. Micr. Sci. xxvii, pp. 109-121, pl. v.
43. WILLIAMS, R. A Case of *Cysticercus* of the Anterior Chamber. Lancet : 1886, i, pp. 102 & 103.
44. ZACHARIAS, O. Zwei neue Vertreter des Turbellarien-Genus *Bothrioplana*. Zool. Anz. ix, pp. 477-479.
45. —. Ueber Fortpflanzung durch spontane Quertheilung bei Süswasserplanarien. Z. wiss. Zool. xliii, pp. 271-275, pl. ix.

ANATOMY, PHYSIOLOGY, AND DEVELOPMENT.

Leuckart has continued (27) the new edition of his "Die Parasiten des Menschen"; the first part of the work has been translated into English by Hoyle (28).

Body-layers of *Platyhelminths*; Schauinsland and others, SB. ges. Morph. ii, pp. 7-10.

Korotneff's account (24) of *Ctenoplana kowalevskii*, n. g. & sp., shows that, like *Ceoloplana*, it is intermediate between the *Ctenophora* and the *Planaria*.

Dinophilus is shown by Weldon (42) to have, in addition to its Turbellarian characters, relations to the Archiannelids.

For observations on *Syndesmis*, which appears to be intermediate between the *Turbellaria* and the *Trematoda*, see FRANÇOIS (9).

The histology of acelous Planarians has been investigated by Delage (7), and the structure of rhabdocelous forms by Böhmig (4). Hallez (15) has found what appears to be an olfactory organ in *Mesostoma lingua*; the anatomy of *M. personatum* is the subject of a preliminary notice by Jaworowski (22).

On the transverse division of fresh-water Planarians [see Zacharias (45)], and on that of *Bipalium*; Bell, J. R. Micr. Soc. (2) vi, pp. 1107 & 1108.

The most striking point in Hubrecht's account of the Embryology of the Nemertinea (17), is the demonstration of the mesoblastic origin of the nervous system.

The structure and metamorphosis of *Pilidium* has been investigated by Salensky (38), who derives the Nemertine proboscis from that of the *Turbellaria*.

Anatomy and histology of *Trematoda*; Monicz (31).

The nervous system of *Cestodes* has been closely investigated by Niemiec (32), who has examined *Ligula*, *Schistocephalus*, *Bothriocephalus*, various *Tænia*, *Tetrarhynchus*, *Anthobothrium*, and *Phyllobothrium*.

G. Joseph on the Central nervous system of *Cestodes*; Ber. deuts. Samml., 59, p. 372.

On the nervous system and excretory apparatus of *Duthiersia* and *Solenophorus*, consult Poirier (35).

On *Phenicurus*, see Spengel, Biol. Centralbl. vi, p. 19; Möbius, t. c. p. 95; Lacaze-Duthiers (26); and Bergh, Arch. Z. expér. (2) iv, pp. 73-76.

GENERA AND SPECIES.

Bipalium; Bell (1).

Pecampia erythrocephala, n. g. & sp.; Giard (12).

Convoluta cinerea, Graff, is a *Cyrtomorpha*; Graff, (13) p. 339.

Enterostoma zooxanthella, n. sp. (Lesina); id. t. c. p. 341.

Bothrioplana silesiaca, and *B. braueri*, n. spp. (P Hirschberg); Zacharias, (44) p. 478.

Oerstedtia cassidens, n. sp. (Jan Mayen); Marenzeller, (30) p. 9.

Cephalotrix viridis;

Polia cæca;

Lineus variegatus, n. spp.;

Cerebratulus fasciolatus var., *C. modestus*, n. sp.: Chapuis (6).

Aspidogaster lenoiri, n. sp. (intestine of *Tetrathyra vaillantii*), p. 20;

Cephalogonimus, n. g., p. 22, for *C. lenoiri*, n. sp. (same host);

Distomum sauromates (lungs of *Elaphis sauromates*), p. 24; *D. oviforme* (intestine of *Nycticebus javanicus*), p. 26; *D. viverini* (bileducts of *Felis viverrinus*), p. 27; *D. longissimum* (intestine of *Delphinus tursio*), p. 29; *D. crocodili* (intestine of *Crocodilus siamensis*), p. 30; *D. siredonis* (intestine of *Siredon mexicanus*), p. 32; *D. delphini* (bileducts of *Delphinus delphis*), p. 34; *D. rochebruni* (liver of *Delphinus delphis*), p. 36; *D. erinaceum* (intestine of *Delphinus delphis*), p. 37, n. spp.; Poirier (37).

Distomum validum, n. sp. (from stomach of a species of Dolphin); Linstow (29), p. 124. *D. spiculator*, Duj., t. c. p. 128; *D. endemicum*, Baelz; Ijima (18). *D. ingens*, Moniez (31).

Diplostomum siamense, n. sp.; Poirier, (36) p. 328; and notes on *D. pseudostomum* and *Polycotyle ornata*, W. Sühm.

Trichosomum papillosum, n. sp. (stomach of *Malapterurus electricus*); Fritsch, (10) p. 105.

Eurycoelum sluiteri, n. g. & sp., of *Trematodes* from the stomach of *Diacono metallicus*; Brock (5).

Note on *Sphyrnura osleri*; Wright, P. Z. S. 1886, p. 343.

Tænia of *Amia calva*; Leidy, P. Ac. Philad. 1886 p. 62.

Tænia echinococcus in Australia; von Lendenfeld, Zool. JB. ii, pp. 409 & 410.

Cysticercus uncinata, Linstow, notes on; Linstow, (29) p. 131.

Bothriocephalus: see van Beneden (2); Küchenmeister (25). Brauer, *Ueber den Zwischenwirth des breiten Bandwurms: Würzburg, 1886; and Parona (33).

Corallobothrium, n. g., allied both to *Pseudophyllidæ* and *Bothrioccephalidæ*, for *C. solidum*, n. sp. (large intestine of *Malapterurus electricus*); Fritsch, (10) p. 100.

Tenia malapteruri, n. sp.; *id.* p. 103.

NEMATOHELMINTHES.

46. COBBOLD, T. S. Description of *Strongylus axei* (Cobb.), preceded by Remarks on its Affinities. J. L. S. xix, pp. 259–264, pl. xxxii.
47. —. Description of *Strongylus arnfieldi* (Cobb.), with observations on *S. tetracanthus* (Mehl.). T. c. pp. 284–293, pl. xxxvi.
48. DE MAN, J. G. Anatomische Untersuchungen über freilebende Nordsee-Nematoden. Leipzig: 1886, fol., 82 pp., 13 pls.
49. HALLEZ, P. Recherches sur l'embryogénie et sur les conditions du développement de quelques Nématodes. Mem. Soc. Lille (4) xv. [Cf. Zool. Anz. ix, p. 608.]
50. LEIDY, J. Notices of Nematoid Worms. P. Ac. Philad. 1886, pp. 308–313.
51. LEUCKART, R. Ein Sphærularia-artiger neuer Nematode. Zool. Anz. ix, pp. 743–746.
52. —. *Asconema gibbosum*, ein Sphærularia-artiger neuer Nematode. Ber. Verh. sächs. Ges. 1886, suppl., pp. 356–365.
53. LINSTOW, O. VON. Ueber den Zwischenwerth von *Ascaris lumbricoides*. Zool. Anz. ix, pp. 525–528.
54. ÖRLEY, L. Die Rhabditiden und ihre medicinische Bedeutung. Berlin: 1886, 84 pp., 6 pls.
55. VEJDovsky, F. Zur Morphologie der Gordiiden. Z. wiss. Zool. xliii, pp. 369–433, pls. xv & xvi.

A paper, unintelligible to the Recorder, on the *Gordiidae*, is published by F. Vajdovsky in SB. böhm. Ges. 1885 (1886) pp. 610–620.

- 55A. WALKER, H. D. The Gape Worm of Fowls (*Syngamus trachealis*); the Earth Worm (*Lumbricus terrestris*), its original host. Bull. Buff. Soc. Nat. Sci. v, pp. 47–71.

Vejdovsky (55) urges the separation of the *Gordiidae* from the round worms, and their closer association with the *Annulata*.

Anguillula of corn, according to the observations of Pennetier (C.R. ciii, p. 284), do not resist dessication for more than fourteen years.

An abstract of Treub's observations on the Nematoid of the sugar-cane, in Naturf. xix, p. 401.

Rhabditis terricola cannot, according to Örley (54), live in the digestive tract of Mammals, being always free and monogenous; the heterogenous forms should make a separate family—the *Rhabdonemidae*.

De Man (48) gives a full account of—

Enoplus communis, p. 14, *E. brevis*, p. 27;

Oncholaimus fuscus, p. 38;

Anticoma pellucida, p. 33 ;

Tripyloides, n. g., p. 60, for *T. vulgaris*, n. sp., p. 61 ;

Euchromadora, n. g., p. 67, for *Chromadora vulgaris*.

The ova of *Ascaris* form the subject of an essay by J. B. Carnoy, *Cellule*, ii, 1, pp. 1-79, pls. i-iv.

Intermediate host of *Ascaris lumbricoides* is probably *Julus guttulatus* ; Linstow, (53) and (29), p. 134.

Linstow (29) has notes on—

Angiostomum nigrovenosum, Rad. ;

Oxysoma brevicaudatum, Zed. ;

And describes *Oxyuris ovocostata* (= *O. glomeridis*, Linstow).

Strongylus axei, Cobbold (46), and *S. arnfieldi* (47).

Filaria scapiceps (beneath skin of hind foot of *Lepus sylvaticus*) ; *F. obtusa* (visceral cavity of *Sturnella magna*), p. 308 ; *F. cirrura* (orbit of *Quiscalus major*) ; *F. stigmatum* (swimming-bladder of *Salvelinus namaycush*), p. 309 ; ? *Monopetalonema eremita* (masseter muscle of *Meles labradorica*), p. 310 ;

Ascaris penita (intestine of *Trachemys scabra*) ; *Physaloptera torquata* (stomach of *Meles labradorica*), p. 312 ; Leidy (50).

Ankylostoma boae (intestine of *Boa constricta*), Blanchard, (3) p. 295 ;

Rictularia bovieri (intestine of *Vespertilio murinus*) ; *id.* p. 297, n. spp.

Asconema gibbosum, n. g. & sp. (body cavity of *Cecidomyia pini*) ; Leuckart (51 & 52).

Sphaerularia in America ; G. Dimmock, *Am. Nat.* xx, p. 73.

ACANTHOCEPHALI.

Echinorhynchus ruber, n. sp., & *E. sp.* (? *porrigens*), from *Balanoptera borealis* ; Collett, *P. Z. S.* 1886, pp. 256-259.

CHÆTOGNATHI.

56. GOURRET, P. Considérations sur la faune pélagique du Golfe de Marseille suivies d'une étude anatomique et zoologique de la *Spadella marioni*. *Ann. Mus. Marseill.* ii, No. 2, 167 pp., 5 pls.

On the geographical distribution of *Sagitta homoptera*, *S. bipunctata*, *S. tricuspidata*, and *Spadella hamata*, see Levinsen, *Vid. Selsk. Skr.* (6) iii, pp. 341-343.

ROTATORIA.

57. BOURNE, A. G. *Rotifera*. *Encycl. Brit.* xxi, pp. 4-8.

58. —. On the Modification of the Trochal Disc of the *Rotifera*. *Rep. Brit. Ass.* 1885 (1886), pp. 1095 & 1096.

59. HERRICH, C. L. Notes on American Rotifers. *Bull. Scient. Labor. Denison Univ.* i, pp. 43-62, pls. ii-iv & x.

60. HUDSON, C. T., & GOSSE, P. H. The *Rotifera* ; or Wheel-Animalcules. London : 1886, large 8vo, 2 vols., 128 & 144 pp., 30 pls.

61. MILNE, W. On the Defectiveness of the Eye-spot as a means of Generic Distinction in the *Philodinaea*, with a description of two other *Rotifera*. P. Phil. Soc. Glasg. xvii, pp. 134-143, pls. xvii & xviii.
62. TESSIN, G. Ueber Eibildung und Entwicklung der Rotatorien. Z. wiss. Zool. xlv, pp. 273-302, pls. xix & xx.
63. ZACHARIAS, O. Ein neues Räderthier (*Stephanops leydigii*). Zool. Anz. ix, pp. 318-320.
64. ZELINKA, C. Studien über Räderthiere. I. Ueber die Symbiose und Anatomie von Rotatorien aus dem Genus *Callidina*. Z. wiss. Zool. xlv, pp. 396-506, pls. xxvi-xxix.

Drying of Rotifers; Zacharias, Biol. Centralbl. vi, p. 230; Hudson, J. R. Micr. Soc. (2) vi, p. 79.

Formation of tube of *Melicerta*; Smithson, J. Quek. Club, ii, pp. 221 & 244.

Conochilus volvox, *Knipowitsch, Arb. St. Petersburg. Naturf. Ges. xvi, p. 5 [Russian]. [Cf. Zool. Anz. ix, p. 362.]

Hudson & Gosse (60) describe as new, all being from various parts of Great Britain:—

- Floscularia algicola*, i, p. 54;
- Melicerta conifera*, p. 72;
- Cephalosiphon candidus*, p. 79;
- Æcistes serpentinus*, p. 80, *Æ. brachiatus*, p. 83, *Æ. stygis*, p. 85;
- Philodina tuberculata*, p. 102;
- Rotifer hapticus*, p. 106;
- Callidina bihumata*, p. 111;
- Pteroessa*, n. g. for *P. surda*, ii, p. 4;
- Pedetes*, n. g. for *P. saltator*, p. 8;
- Albertia intrusor*, p. 15, *A. naidis* (Bousfield MS.) p. 16;
- Notommata cyrtopus*, p. 22, *N. pilarius*, n. n. for *N. tripus*, Leydig, p. 23;
- Copeus labiatus*, n. n. for *N. centrum*, Leydig, p. 28, *C. pachyurus*, p. 31, *C. cerberus*, n. n. for *N. centrura*, Gosse, p. 34;
- Proales*, n. g. for *N. decipiens*, *N. felis*, and *N. gibba*, Ehr., p. 36, *P. sordida*, p. 37, *P. tigridia*, p. 38;
- Furcularia ensifera*, p. 43, *F. boltoni*, p. 45, *F. micropus*, p. 46;
- Diglena gibber*, p. 49, *D. circinator*, p. 50, *D. giraffa*, p. 51, *D. permollis*, *D. clastopis*, p. 52;
- Distemma raptor*, p. 54, *D. collinsii*, p. 55, *D. labiatum*, p. 56;
- Mastigocerca lophoessa*, p. 60, *M. scipio*, *M. macera*, p. 61, *M. elongata*, p. 62;
- Rattulus helminthodes*, p. 65, *R. cimolius*, *R. calyptus*, *R. sejunctipes*, p. 66;
- Calopus*, n. g. for *Monocerca porcellus*, Gosse, p. 67, *C. tenuior*, p. 68, *C. cavia*, p. 69, *C. (?) minutus*, p. 70;
- Scaridium eudactylotum*, p. 74;
- Stephanops chlæna*, p. 76;

- Diaschiza*, n. g. for *D. valga*, p. 77, *D. exigua*, p. 78, *D. hoodii*, *D. pata*, p. 79, *D. semiaperta*, p. 80, *D. tenuior*, p. 81 ;
Salpina macracantha, p. 84, *S. eustala*, p. 85, *S. sulcata*, p. 86 ;
Diplois, n. g. for *D. propatula*, *D. daviesiae*, p. 87 ;
Euchlanis lyra, p. 89 ;
Oathypna, n. g. for *Euchlanis luna*, Ehr., p. 94, *C. rusticula*, p. 95, *C. sulcata*, p. 96 ;
Distyla flexilis, p. 97 ;
Monostyla lordii, p. 99 ;
Colurus obtusus, p. 103, *C. amblytelus*, p. 104, *C. dactylopus*, *C. pedatus*, *C. caelopus*, p. 105 ;
Metopidia rhomboides, p. 108 ;
Mytilia tavina, n. g. & sp., p. 110 ;
Cochleare, n. g. for *C. staphylinus* and *C. turbo*, p. 111 ;
Pterodina mucronata, p. 114, *P. truncata*, n. n. for *P. elliptica*, Gosse, p. 115 ;
Notholca, p. 125, n. g. for *Anurcea acuminata*, Ehr., and *A. longispina*, Kell., *N. thalassia*, *N. scapha*, p. 127 ;
Eretmia, n. g. for *E. pentathrix* and *E. cubeutes*, p. 128, *E. trithrix* and *E. tetrathrix*, p. 134.
Euchlanis ampuliformis, p. 48 (Minnesota) ;
Diurella insignis, p. 50 (Minnesota) ;
Salpina affinis, p. 52 (Minneapolis) ;
Distyla minnesotensis, p. 53, *D. ohioensis*, p. 54 ;
Plaosoma, n. g. for *P. lenticulare*, p. 57 (Hebron, Ohio) ;
Asplanchna magnificus, p. 60 (Minnesota) ;
n. spp., Herrick (59).
Floscularia millsii, n. sp. (Buffalo) ; Kellicott, P. Am. Micr. Soc. viii, p. 48, 1 fig.
Diglena ? uncinata, n. sp., Milne, (61) p. 141 (Hab. ?).
Stephanops stylatus, n. sp., *id. t. c.* p. 143 (Hab. ?) ; *S. leydigii* (Germany), Zacharias (63).

GEPHYREA.

65. CONN, H. W. Life History of *Thalassema*. Stud. Biol. Lab. J. Hopkins Univ. iii, pp. 351-401, pls. xx-xxiii.
66. GUERNE, J. DE. Sur les Géphyriens de la famille des Priapulides recueillis par la mission du Cap Horn. C.R. ciii, pp. 760-762.
67. RIETSCH, M. Etude sur les Géphyriens armés ou Echiuriens. Rec. Z. Suisse iii, pp. 314-515, pls. xvii-xxii.
68. SCHAUINSLAND, H. Die Excretions und Geschlechtsorgane der Priapuliden. Zool. Anz. ix, pp. 574-577.
69. SLUITER, C. P. Beiträge zu der Kenntniss der Gephyreen aus dem Malayischen Archipel. Nat. Tijdschr. Nederl. Ind. xlv, pp. 472-517, 4 pls.

The researches of Conn (65), which were conducted on *Thalassema mellita*, n. sp., lead him to agree with those who regard the *Gephyrea* as modified Annelids. He describes the developmental history very fully.

Rietsch (67), who has investigated the structure of *Thalassema neptuni*, *Echiurus pallasi*, and two species of *Bonellia*, describes the systems of organs in great detail.

Schauinsland (68) points out the great differences which obtain between the excretory organs and genital products of *Priapulidæ* and other *Gephyrea*.

Sluiter (69, p. 516) gives a list of the species described by him from the Malay Archipelago in 1881-85; he describes as new:—

Sipunculus billitonensis, p. 487;

Aspidosiphon tenuis, p. 491, *A. levis*, p. 493, *A. rarus*, p. 495, *A. exilis*, p. 497;

Phymosoma spengeli, p. 498, *P. duplici-granulatum*, p. 501, *P. poaron*, p. 505, *P. microdonto*, p. 506, *P. lacteum*, p. 507, *P. diaphanes*, p. 509, *P. maculatum*, p. 511;

Phascolosoma abnormis, p. 513.

Priapuloides australis, n. sp., Guerne (66), p. 761.

Actinotrocha of British Coasts; Nature xxxiv, pp. 361, 387, 439, 468.

ANNULATA.

70. ALBERT, F. Ueber die Fortpflanzung von *Haplosyllis spongicola*, Gr. MT. z. Stat. Neap. vii, pp. 1-26, pl. i.

71. BEDDARD, F. E. Note on the Structure of a large species of Earthworm from New Caledonia. P. Z. S. 1886, pp. 168-175, pl. xix.

72. —. Descriptions of some new or little known Earthworms, together with an Account of the Variations in Structure exhibited by *Perionyx excavatus*, E. P. T. c. pp. 298-314.

73. —. On the Anatomy and Systematic Position of a Gigantic Earthworm (*Microchaeta rappi*) from the Cape Colony. Tr. Z. S. xii, pp. 63-76, pls. xiv & xv.

74. —. Contributions to the Structure of the *Oligochaeta*. Rep. Brit. Ass. 1885 (1886), pp. 1102 & 1103.

75. —. Notes on some Earthworms from Ceylon and the Philippine Islands, including a description of two new species. Ann. N. H. (5) xvii, pp. 89-98, pl. ii.

76. —. Note on the ovaries and oviducts of *Eudrilus*. Zool. Anz. ix, pp. 342-344.

77. BENEDICT, J. E. Descriptions of ten Species and one new Genus of Annelids from the dredgings of the U.S. Fish Commission steamer 'Albatross.' P. U. S. Nat. Mus. ix, pp. 547-553, pls. xx-xxv.

78. BENHAM, W. B. Studies on Earthworms. I. Q. J. Micr. Sci. xxvi, pp. 213-302, pls. xv-xvibis. II. Op. cit. xxvii, pp. 77-108, pls. viii & ix.

79. BERGH, R. S. Ueber die Deutung der allgemeinen Anlagen am Ei der Clepsinen und der Kieferegel. Zool. Anz. ix, pp. 112-119.
80. —. Vorläufige Mittheilung über die Geschlechtsorgane der Regenwürmer. T. c. pp. 231-235.
81. —. Untersuchungen über den Bau und die Entwicklung der Geschlechtsorgane der Regenwürmer. Z. wiss. Zool. xlv pp. 303-332, pl. xxi.
82. BOURNE, A. G. On Budding in the *Oligochaeta*. Rep. Brit. Ass. 1885 (1886) pp. 1096 & 1097.
83. BOUSFIELD, E. C. On the Annelids of the Genus *Dero*. Rep. Brit. Ass. 1885 (1886) pp. 1097 & 1098.
84. —. On *Slavina* and *Ophidonais*. J. L. S. xix, pp. 264-268, pl. xxxiii.
85. CHWOROSTANSKY, C. Organes génitaux de l'*Hirudo* et de l'*Aulastoma*. Zool. Anz. ix, pp. 446-448.
86. *DIEFFENBACH, O. Anatomische und Systematische Studien an *Oligochaeta limicola*. Giessen: 1885, 44 pp. [Cf. Zool. Anz. ix, p. 358.]
87. DUTILLEUL, G. Sur l'appareil générateur de la Pontobdelle. C.R. cii, pp. 559-562.
88. EMERY, C. La Régénération des segments postérieurs du corps chez quelques Annélides polychètes. Arch. Ital. Biol. vii, pp. 395-403.
89. FLETCHER, J. J. Notes on Australian Earthworms. I. P. Linn. Soc. N.S.W. (2) i, pp. 523-574, pls. viii & ix; II, t. c. pp. 943-973, pl. xiii.
90. FRANÇOIS, P. Contribution à l'étude du système nerveux central des Hirudinées. Tabl. Zool. i, pp. 121-227, pls. xxx-xxxviii. Also separately, Paris: 1886 [see Rev. Sci. (3) xi, pp. 564 & 565.]
91. GIARD, A. Sur quelques Polynoidiens. Bull. Sci. Nord. (2) ix, pp. 1-18 & 334-344.
92. —. Fragments biologiques. v. Sur *Ophiodromus herrmanni*, Giard; t. c. pp. 93-97. vi. Sur le développement de *Magelona papillicornis*, pp. 98 & 99.
93. HASWELL, W. A. On the Structure of the so-called Glandular Ventricle (Drüsenmagen) of *Syllis*. Q. J. Micr. Sci. xxvi, pp. 471-480, pl. xxv.
94. —. Observations on some Australian *Polychaeta*. P. Linn. Soc. N.S.W. x, pp. 733-756, pls. I-lv.
95. HORST, R. Contributions towards the Knowledge of the *Annelida polychaeta*. I. *Amphinomida*. Notes Leyd. Mus. viii, pp. 157-174, pls. vii & viii.
96. JOURDAN, E. Contribution à l'anatomie des Chlorémiens. C.R. cii, pp. 270-272.

97. [JOURDAN, E.] Structure de la vésicule germinative du *Siphonostoma diplochaetos*. *T. c.* pp. 1494-1496.
98. —. Les antennes des Euniciens. *C.R.* ciii, pp. 216-218.
99. KENNEL, J. Ueber einige Landblutegel des tropischen America. *Zool. JB.* ii, pp. 37-64, pls. iii & iv.
100. KLEINENBERG, N. Die Entstehung des Annelids aus der Larve von *Lopadorhynchus*. Nebst Bemerkungen über die Entwicklung anderer Polychaeten. *Z. wiss. Zool.* xlv, pp. 1-227, pls. i-xvi.
101. LEVINSSEN, G. M. R. *Spolia atlantica*. Om nogle pelagische Annulata. *Vid. Selsk. Skr.* (6) iii, pp. 325-344, 1 pl.
102. LEYDIG, F. Die riesigen Nervenröhren im Bauchmark der Ringelwürmer. *Zool. Anz.* ix, pp. 591-597.
103. MCINTOSH, W. C. On a new British *Staurocephalus*. *Rep. Brit. Ass.* 1885 (1886) p. 1073.
104. MICHAELSEN, W. Ueber *Enchytraeus mæbii*, Mich., und andere Enchytraëiden. Kiel: 1886.
105. —. Ueber Chylusgefäß systeme bei Enchytraëiden. *Arch. mikr. Anat.* xxviii, pp. 292-304, pl. xxi.
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111. ROSA, D. Noti sui Lombrici del Veneto. *Atti Ist. Venet.* (6) iv, pp. 1-15. [Abstract, *Boll. Mus. Zool. Torin.* i, No. 3, 1 p.]
112. —. *Allolobophora celtica*, n. sp. *Boll. Mus. Zool. Torin.* i, No. 2, 2 pp.
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114. —. I *Lumbricidi antecitellani* in Australia. *T. c.* No. 18, 2 pp.
115. SAINT-LOUP, R. Sur une nouvelle Ichthyobdelle. *C.R.* cii, pp. 1180-1183.
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- 116A. —. *Dero digitata*, O. F. Müller, &c. *SB. böhm. Ges.* 1885 (1886), pp. 310-340, 2 pls.
A French résumé on pp. 335-340.
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118. [VIALLANES, H.] Sur l'endothélium de la Cavité générale de l'Arénicole et du Lombric. *T. c. art.* No. 3, 10 pp., 1 pl.
119. —. Sur le tissu cartilagineux de la Sabelle. *Bull. Soc. Philom.* (7) x, pp. 6-8.
120. VIGUIER, C. Etudes sur les Animaux inférieurs de la Baie d'Alger. II. Recherches sur les Annélides Pélagiques. *Arch. Z. expér.* (2) iv, pp. 347-442, pls. xxi-xxvii.
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122. WHITMAN, C. O. The Germ-layers of *Clepsine*. *Zool. Anz.* ix, pp. 171-176.
123. —. The Leeches of Japan. *Q. J. Micr. Soc.* xxvi, pp. 317-416, pls. xvii-xxi.
124. WIREN, A. *Hæmatocleptes terebellidis*, nouvelle annelide parasite de la famille des Euniciens. *Bih. Sv. Ak. Handl.* xi, No. 12, 9 pp., 2 pls.
125. ZITTEL, V. —, & ROHON, J. V. Ueber Conodonten. *SB. bayer. Ak.* 1886, pp. 108-136, pls. i & ii.

ANATOMY, PHYSIOLOGY, AND DEVELOPMENT.

An important and suggestive essay on the development of the *Polychæta* has been published by Kleinenberg (100); Viguier (120), and Albert (70), have written on the development of the *Syllidæ*; and Emery (88) on regeneration in various *Polychæta*.

Jourdan (96-98) has made various contributions to our knowledge of the anatomy of some Worms, and Viallanes (117) has described the branchial skeleton of *Sabella*.

The structure of Earthworms has been investigated by Beddard (71-76), who describes various new exotic forms, and, in (72), gives an account of the variations exhibited by *Perionyx excavatus*; by Benham (78), who has also examined several new foreign species; by Bergh (81) and Neuland (106), who treat of the structure and development of the generative organs; and by Leydig (102), who has re-examined the colossal nerve-fibres. Hæmatoporphyrin has been found by McMunn in the integument of *L. terrestris*; *J. Physiol.* vii, p. 248. The mode of budding in *Oligochæta* has been studied by Bourne (82) in *Nais* (*Stylaria*) *proboscidea*.

The organogeny of the *Hirudinea* has been investigated by Nusbaum (107); Whitman's (123) essay on the Leeches of Japan is of great morphological value; Bergh has studied (79) the ovum of *Clepsine* and the *Gnathobdellidæ*. Voigt (121) makes some additions to Dörner's memoir on *Branchiobdella varians*; see also Chworostansky (85), and Dutilleul (87). On the nervous system of Leeches, see François (90).

Viguier (120) describes the following *Phyllodoceidæ* and *Alciopidæ* :—

Pelagobia longocirrata, p. 377;

Maupasia cæca, n. g. & sp., p. 382;

Hydrophanes krohnii, p. 385;

Pontodora pelagica, p. 388 ;
Iospilus phalacroides, n. g. & sp., p. 392.
Phalacrophorus pictus, p. 395 ;
Alciope microcephala, n. sp., p. 404 ;
Vanadis heterochaeta, n. sp., p. 405 ;
Rhynchonerella capitata (?), Greef, p. 408 ;
Tomopteris kefersteini is noticed, p. 412.

Of *Aphroditidae*, *Polynoe* sp. is mentioned, p. 416 ; of *Eunicidae* only, *Ophryotrocha puerilis*, p. 417. There are remarks on the life-history of *Syllidae* and *Amblyosyllis algefneæ*, n. sp., p. 425. *Virchowia clavata*, p. 426, *Autolytus prolifer*, p. 429, and *Myrianida fasciata*, p. 432, are described.

The pelagic Chætopods described by Lievinen (101) are :—

Corynocephalus, n. g. (*Alciopidarum*), for *C. albomaculatus*, n. sp., p. 327 ;
Rhynchonerella longissima, n. sp., p. 330 ;
Nauphanta celox, Greef, p. 331 ;
Callizona grubei, Greef, p. 333 ;
Liocapa candida, D. C., p. 333 ;
Lopadorhynchus brevis, Gr., p. 334 ;
Travisioopsis (n. g. *Typhoscolecidarum*) for *T. lobifera*, p. 336.

Haswell (94) describes the following new Australian *Polychæta* :—

Syllis corruscans, p. 734, *S. kinbergiana*, p. 739, *S. teniaformis*, p. 741, *S. schmardiana*, p. 742, *S. nigropunctata*, p. 744 ; *Gnathosyllis zonata*, p. 746 ;
Staurocephalus australis, p. 747 ;
Eulalia (Eumida) quadrocula, p. 748 ;
Psamathe ? crinita, p. 749 ;
Siphonostoma affine, p. 750 ; and
Halla australis, p. 752.

Giard (91) emends the generic characters of :—

Lænilla (notes on *L. castanea*, p. 3, and *L. alba*, p. 6) ;
Hermadion (H. echini), n. sp., p. 8, *H. pellucidum*, p. 12) ;
Evarne pentactæ (commensal on *Cucumaria pentactes*), n. sp., p. 14 ; *E. impar*, notes on, p. 16 ; *E. areolata*, p. 341.

Horst (95) describes the following new *Amphinomidae* :—

Amphinome longosetosa, p. 160 ;
Pherecardia, n. g. for *P. lobata*, p. 165 ; and has notes on :—
Amphinome rostrata, *Hermodice carunculata*, *Eurythoe alcyonia*, *Chlæia flava*, *C. parva*, *Notopygos crinita*, *Hipponoe gaudichaudi* ; *Euphrosyne laureata*, and *E. mediterranea*.

Malmgrenia castanea ;

Hermadion assimile : notes on ; Rep. Fauna Liverpool Bay, i (1886), p. 345.

Synonymy of *Pectinaria belgica* and *P. auricoma* ; t. c. p. 349.

Hematocleptes terebellidis, n. g. (*Eunicidarum*) & n. sp. ; Wiren (124).

Onuphis grubii, n. n. for *O. conchylega*, Sars, from West Coast of France ; Marenzeller, (30) p. 13.

Protula diomedee (Cape Hatteras, &c.), p. 547, *P. alba* (St. Thomas, W.I.), p. 549, n. spp.;

Hydroides dianthus, Vl., *H. spongicola* (Gulf of Mexico), p. 549, *H. protulicola* (Cape Hatteras), p. 550, n. spp.;

Crucigera, n. g. for *C. websteri*, n. sp. (Gulf of Mexico), p. 551;

Pomatostegus stellatus, Schm., p. 551;

Spirobranchus giganteus, Pall., p. 551, *S. incrassatus*, Kröyer, p. 552, *S. dendropoma*, Mörch, p. 553: Benedict (77).

On Kinberg's genera of Earthworms, see Perrier (109), and Benham, (78) p. 99.

Lumbricus terrestris with bifurcated tail; Horst, Notes Leyd. Mus. viii, p. 42.

Perichæta indica, Horst, p. 298, *P. horsti*, n. sp. (Manila), p. 300;

Eudrilus boyeri, n. sp. (New Caledonia), p. 302;

Perionyx excavatus, E. P., p. 308: Beddard (72).

Microchæta, n. g.; *M. rappi*, n. n. for *Lumbricus microchæta*, Rapp: Beddard, (73) & (72) p. 306. See also Benham, (78) p. 267.

Perichæta ceylonica (Ceylon), p. 89;

Monilogaster barwelli (Philippines), p. 94; n. spp.: Beddard (75).

Acanthodrilus layardi (New Caledonia), n. sp., *id.*, (71) p. 168.

Microchæta beddardi (Natal), n. sp., p. 78;

Urobenus, n. g., for *U. brasiliensis*, n. sp. (Pedza açu, Brazil), p. 82;

Diachæta, n. g., for *D. thomasi* (St. Thomas, W.I.), p. 89;

Trigaster, n. g., for *T. lankesteri* (St. Thomas), p. 94:

Benham (78).

Allolobophora celtica (Brest), Rosa (112); *A. veneta*, *A. ninnii* (Venice), n. spp.; *id.*, (111).

Lumbricus novæ-hollandiæ, Kinberg, p. 539; but corrected on p. 946 to *L. (Allolobophora) australiensis*, n. sp.;

Notoscolex, n. g. (intraclitelline) for *N. camdenensis*, p. 546; *N. grandis*, p. 551, n. spp. (Burrawang, Camden co., N.S.W.);

Didymogaster, n. g. (differs from *Digaster*, P., in being intraclitelline), for *D. sylvaticus*, p. 554 (N.S.W.);

Perichæta australis, p. 561 (Sydney), *P. coxii*, p. 565 (Mount Wilson);

Cryptodrilus, n. g. (postclitellian), for *C. rusticus*, n. sp., p. 570 (Burrawang);

Digaster armifera, n. sp., p. 947 (N.S.W.);

Cryptodrilus saccarius, n. sp., p. 951 (near Sydney);

Perichæta tenax, p. 953 (near Parramatta), *P. austrina*, p. 956 (Burrawang), *P. gracilis*, p. 958 (near Parramatta), *P. barronensis*, p. 960 (N. Queensland), *P. queenslandica*, p. 962 (N. Q.), *P. darnleiensis*, p. 966 (Darnley Is.), *P. peregrina*, p. 969 (Sydney ?); n. spp.: Fletcher (89).

Buchholzia, n. g., for *Enchytræus appendiculatus*, Buchholz; Michaelsen (105) p. 293.

Enchytræus tenuis, n. sp. (Hamburg); *id. t. c.* p. 294.

A. Stole gives, in his native tongue, an account of the *Tubificidæ*:

Lophochæta, for *L. ignota*, and

Bothrioneuron, for *B. vej dovskyanum*, are new [SB. böhm. Ges. 1885 (1886) pp. 640-647].

On *Dero*, *Slavina* and *Ophidonais*, see Bousfield (83 & 84).

Æolosoma variegatum; Vejdvosky, SB. böhm. Ges. 1885 (1886), pp. 275-290.

Whitman (123) describes—

Hæmodipsa japonica, p. 323;

Hirudo nipponia, p. 349;

Macrobdella sestertia, p. 378;

Leptosoma, n. g., for *L. pigrum*, p. 382, *L. edentulum*, p. 386, *L. acranulatum*, p. 389, all n. spp. from Japan.

Scorpenobdella, n. g., for *S. elegans*, from *Scorpena scrofa*; Saint-Ioup, (115) p. 1181.

Cylicobdella lumbricoides, Grube, *C. coccinea*, n. sp. (Trinidad), p. 62;

Lumbricobdella, n. g., for *L. schæfferi*, n. sp. (Trinidad), p. 62; Kennel (99).

MYZOSTOMATA.

*126. WAGNER, F. VON. Das Nervensystem von *Myzostoma*. Graz. 1886 (cf. Zool. Anz. x, p. 622).

ENTEROPNEUSTI.

127. BATESON, W. Continued Account of the Later Stages in the Development of *Balanoglossus kowalevskii*, and of the Morphology of the *Enteropneusta*. Q. J. Micr. Sci. xxvi, pp. 511-534, pls. xxviii-xxxiii.

128. HALDEMAN, G. B. Note on *Tornaria* and *Balanoglossus*. J. Hopk. Univ. Circ. v, pp. 44 & 45.

129. KOEHLER, R. Observations Zoologiques et Anatomiques sur une nouvelle espèce de *Balanoglossus*. C.R. cii, pp. 224-227.

130. —. Note sur le *Balanoglossus sarniensis*. T. c. p. 440.

131. —. Sur la parenté du *Balanoglossus*. Zool. Anz. ix, pp. 506 & 507.

132. —. Contribution à l'étude des Entéropneustes. Intern. J. Anat. Hist. iii, pp. 139-190, pls. iv-vi.

133. MARION, A. F. Études Zoologiques sur deux espèces d'Entéropneustes (*Balanoglossus hacksi* and *B. talaboti*). Arch. Z. expér. (2) iv, pp. 305-326, pls. xvi & xvii.

134. POUCHET, —. Observations relatives à la Note récente de M. Koehler sur une nouvelle espèce du *Balanoglossus*. C.R. cii, p. 272.

Bateson's further observations (127) deals chiefly with *Balanoglossus kowalevskii*, but there are also comparative notes on *B. salmoneus*, and *B. robinii*.

The *Tornaria* observed by Haldeman (128) was traced through its transformations; the water vessels are allowed to be homologous with those of *Bipinnaria*.

Koehler (129 & 130) and Pouchet (134) discuss the name to be applied to the species of *Balanoglossus* which is found at Herm.

COELENTERATA.

BY

J. ARTHUR THOMSON, M.A., F.R.S.E.,

Lecturer on Zoology in the School of Medicine, Edinburgh.

LIST OF PUBLICATIONS.

BALE, W. M. The Genera of *Plumulariidae*, with Observations on various Australian Hydroids. Tr. R. Soc. Vict. xxii, 38 pp. [see 1887]; J. R. Micr. Soc. 1887, p. 248.

Revision of genera; classificatory notes; critical review of recent researches; *Sertularella johnstoni* and *Plumularia watsii*, n. spp.

*BARROIS, C. Sur le calcaire à polypiers de Cabrières, Hérault. Ann. Soc. géol. Nord. xiii, pp. 74-101.

BEDOT, M. Recherches sur les Cellules Urticantes. Rec. Z. Suisse, iv, (1), pp. 51-70, 2 pls.; Arch. Sci. nat. xv, pp. 415 & 416; J. R. Micr. Soc. vi (4), pp. 626 & 627.

Nematocysts in *Siphonophora*; histology and development of Nematocysts in *Veilellidae* and *Physalidae*.

BRAUN, M. Zur Behandlung der Anthozoen. Zool. Anz. ix (1886), pp. 458 & 459.

Preparation of *Anthozoa*.

BRAZIER, J. Notes on the Distribution of *Ceratella fusca*, Gray. P. Linn. Soc. N.S.W. (2) i, June, 1886, pp. 575 & 576; Ann. N. H. xviii, p. 499.

*BRECKENFELD, A. H. Natural History of *Hydra* (popular). Am. Micr. J. vii, No. 12, pp. 221-227.

BROOKS, W. K. The Life-history of the *Hydromedusae*; a Discussion of the Origin of the *Medusa*, and the significance of Metagenesis. Mem. Bost. Soc. iii, No. 12, pp. 359-430; J. Hopk. Univ. Circ. v, pp. 86-88; Ann. N. H. xviii, pp. 22-30; J. R. Micr. Soc. vi (4), pp. 625 & 626.

Discussion of *Narcomedusae*, *Cunocantha octonaria*, *Trachomedusae*, *Liriope scutiger*, *Geryonidae*, *Anthomedusae*, *Turritopsis*, *Eutima*. Life-

histories of *Hydromedusæ*. *Medusa* stage more primitive than Hydroid. Remote ancestor a solitary swimming *Hydra* or *Actinula*, becoming more and more natatory and medusoid, without alternation of generations. Larva became fixed, budded off *Medusæ*; gradual degradation to forms like *Hydractinia*.

*BURMEISTER, H. Notice sur les *Hydromedusæ argentinæ*. Ann. Soc. Arg. xxi.

*CANAVARI, M. *Elipsactinia* di Monte Giano, del Gran Sasso, del Gargano e di Gebel-Ersass in Tunisia. P.-v. Soc. Tosc. v, pp. 67 & 68.

CHUN, C. Ueber Bau und Entwicklung der Siphonophoren. SB. Ak. Berlin, 1886, pp. 681-688.

Eudoxia stage of Mediterranean *Calicophoridae*; doubtful if in any others. 1. *Cuboides vitreus* (?), Quoy & Gaimard; *Eudoxia cuboides*, Leuckart, = *Abyla pentagona*, Eschscholtz. 2. *Eudoxia messanensis*, Gegenbaur; *E. campanula*, Leuckart, = *Diphyes acuminata*, Leuckart. 3. *Ersæa truncata*, Will; *Diplophysa inermis*, Gegenbaur, = *Monophyes gracilis*, Claus. 4. *Ersæa pyramidalis*, Will; *Eudoxia eschscholtzii*, Busch, = *Muggicea koshii*, Chun. 5. *Ersæa elongata*, Will, = *Diphyes subtilis*, Chun. The commonest form.

CLAUS, C. Ueber *Deiopea kaloktenota*, Chun, als Ctenophore der Adrien. Arb. z. Inst. Wien, vii, pp. 83-96, 1 pl.

Description and promorphological discussion of *Deiopea kaloktenota*, found in the Adriatic.

—. Ueber die Classification der Medusen mit Rücksicht auf die Stellung der sogenannten Peromedusen, der Periphylliden und Pericalpiden. T. c. pp. 97-110, 4 figs.

Elaboration of system of *Acraspeda*. I. *Tetrameralia*, with orders *Calycosoa* and *Marsupialia*. II. *Octomeralia*, with order *Discophora* and suborders *Catamnata* and *Acatamnia* (*Monostomeæ* and *Rhizostomeæ*).

CLUBB, J. A. List of the *Medusæ* and *Ctenophora* of the L. M. B. C. District. Fauna Liverpool Bay, pp. 114-119.

COLE, A. C. Spicules of *Gorgonia*. Stud. Micr. Sci. iv (1886) [see (4), p. 7]; J. R. Micr. Soc. vi (6), p. 1074.

Preparation of spicules.

*DANA, J. D. Origin of Coral Reefs and Islands. Am. J. Sci. xxx (1885), pp. 89 & 169.

DANIELSSEN, D. C. The Norwegian North-Atlantic Expedition—*Alcyonida*. N. Mag. Naturv. xxx, pp. 81-98. [See 1887.]

20 new species; new genera, *Vöringia*, *Drifa*, *Nannodendron*, *Fulla*, *Gersemiopsis*, *Barathrobius*.

DUNCAN, P. MARTIN. On the *Madreporaria* of the Mergui Archipelago. J. Linn. Soc. xxi, pp. 1-25, 1 pl.

13 new species described.

[DUNCAN, P. M.] On the *Astrocania* of the Sutton Stone and other Deposits of Infra Lias of South Wales. R. J. Geol. Soc. xlii, pp. 101-112, 1 pl.

Notes especially on *A. gibbosa*, and 7 other species.

— On the Structure and Classificatory Position of some *Madreporaria* from the Secondary Strata of England and South Wales. T. c. pp. 113-142.

Special reference to papers of R. F. Tones.

— Answer to "Observations on some imperfectly known *Madreporaria* from the Cretaceous Formation of England," by R. F. Tones. Geol. Mag. iii, pp. 52-55.

ELLIS, J. W. Report on *Actiniaria* Liverpool Bay District. L. M. B. C. Rept. i, pp. 123-130.

ERDMANN, A. Ueber einige neue Zoantheen. Jen. Z. Nat. xix, pp. 430-488, 2 pls.

General anatomical and systematic notes on *Zoantharia*, with definitions of genera and descriptions of species.

ETHERIDGE, R. [JUN.] [See NICHOLSON, H. A.]

*FAXON, W. *Acalephs*. Selections from embryological monographs. Mem. Mus. C. Z. ix.

*FEWKES, J. W. Report on the *Medusæ* collected by the U. S. Fish Commission steamer 'Albatross' in the Region of the Gulf Stream in 1883-84. Washington: 1886, 8vo, 47 pp., 10 pls., for Rep. U. S. Fish Comm., pt. xii, pp. 927-977, 10 pls.; J. R. Micr. Soc. 1887, p. 248

11 new species; new genera, *Nauphantopsis*, *Ephyroides*, *Pterophysa*, *Angelopsis*; new families, *Halicreasidae*, *Angelidae*; *Atolla bairdii*, n. sp. (regarded by Hæckel as a deep-sea genus), found at surface. Bathymetrical distribution of *Medusæ*.

FOORD, A. H. [See NICHOLSON, H. A. (3).]

FOWLER, G. H. The Anatomy of the *Madreporaria*. Q. J. Micr. Sci. xxvii (1886). [Cf. Stud. Biol. Lab. Owens Coll. Man. pp. 1-16, 1 pl.

Madrepora durvillei, with features resembling *Alcyonaria*, tendency to absence of polyps from ventral side of branches and branchlets, strong development of axial and abaxial septa, bilateral symmetry, 6 mesenteries, and distinct dimorphism, but both forms reproductive and digestive. *M. aspera*, no dimorphism, but similar structure of colonies and differentiation of mesenteries.

FORD, S. W. Note on the recently-proposed genus *Billingsia*. Am. J. Sci. xxxii, p. 325.

The name *Billingsia* changed *Elkania*, since former already used.

*FRECH, F. Die *Cyathophylliden* und *Zaphrentiden* des deutschen Mitteldevon. Pal. Abh., pp. 117-234, 8 pls. Berlin (Reimer): 4to.

*FROMENTEL, DE. Paléontologie Française. Terrain Crétacé lviii, 11 pls.

GOETTE, A. Verzeichniss der Medusen, auf S.M.S. 'Prinz Adalbert, gesammelt. SB. Ak. Berlin, xxxix, p. 831-837.

Irenopsis hexanemalis, n. g. & sp.; *Glossocodon haeckelii*, n. sp.; *Sanderia malayensis*, n. g. & sp.; *Crossostoma*, n. sp.

—. Entwicklungsgeschichte der *Aurelia aurita* und *Cotylorhiza tuberculata*. (Abh. zur Entw. gesch. d. Thiere, 4 heft., 79 pp., 9 pls.) Hamburg u. Leipzig: Nov. 1886, 4to. [See 1887.]

*GREEFF, R. Ueber westafrikanische Stylasteriden. SB. Ges. Marb. 1886, pp. 11.

1 new species.

HAACKE, W. Zur Physiologie der Anthozoen. Zool. Gart. xxvii, pp. 284-286.

—. Ueber die Ontogenie der Cubomedusen. Zool. Anz. ix (1886), pp. 554 & 555; J. R. Micr. Soc. vi, p. 999.

Charybdea rastoni (Gulf of St. Vincent, S. Australia), apparently with alternation of generations (so Hæckel, not so Claus). Two unpaired, unequal, axial eyes in adult; four paired eyes in young form. Velar canals primitively unbranched. Development of sense-organs, phacellæ, &c.

*HALL, J. Fossil Corals and Bryozoans of the Lower and Upper Helderberg, &c. New York State Geologist's Report. Albany: 1886, 4to, 64 pls.

HARTLAUB, CL. Ueber den Bau der *Eleutheria* Quatref. Zool. Anz. No. 239, pp. 706-711.

This creeping Cladonemid has a bell of normal width, with broad velum, marked urticating ridge below tentacle zone; a brood cavity not in communication with the stomach cavity, but lined with a special epithelium, and connected with the cavity of the bell by six interradiat canals. It is hermaphrodite, with female elements on ventral, and male on dorsal epithelium of brood-chamber. Buds from the circular canal.

HEIDER, A. R. v. Korallenstudien. Z. wiss. Zool. xlvii, pp. 507-535, 2 pls.

Description of skeleton and tissues of *Astroides calicularis*, Blainv., and *Dendrophyllia ramea*, Linn. General notes on structure. Proposal to divide *Madreporaria* into (1) *Euthecalia*, in which body-wall secretes lime in its mesoderm lamella, and forms an independent *Eutheca*, with which the septa are subsequently united; and (2) *Pseudothealia*, in which body-wall remains unmodified, and the independent septa, united by their peripheral ends, form a *pseudotheca*.

HEIDER, K. Zur Metamorphose der *Oscarella lobularis*. Arb. z. Inst. Wien, vi.

Inter alia, discussion of relation of *Porifera* to *Cœlenterata* [see Sponges].

HERDMAN, W. A. Report on *Aleyonaria*, L. M. B. C. District. Fauna Liverpool Bay, pp. 120-122. [*Sarcodictyum catenata*, Forbes.]

—. [See MELLY, W. R.]

*HERRMANN, O. On the Graptolite Family *Dichograptidae*, Lapw. Geol. Mag. iii, pp. 13-26; N. Mag. Naturv. xxix, pp. 209-214.

HICKS, J. S. [See MELLY, W. R.]

HICKSON, S. J. Preliminary Notes on certain Zoological Observations made at Talisee Island, North Celebes. P. R. Soc. xl, pp. 322-325.

Clavularia viridis, allied to extinct Alcyonarian *Syringopora*; young colonies like *Cornularia*, adult like *Tubipora*; a connecting link corroborating suggested union of *Tubipora* with the *Cornularidae*, into a group of *Stolonifera*. Also generative capsules of *Millepora*.

*JUNGENSEN, H. F. E. Kara Havets Alcyonider. Kjøbenhavn; 2 Tavl. 8 p. Saertr. af. Dijnphna-Togtets zool. bot. Udbytte.

KLAATSCH, H. Ueber eine neue Stielbildung bei *Tubularia mesembryanthemum*. Arch. mikr. Anat. xxvii (1886), pp. 632-650, 1 pl.

Abnormal formation of secondary stalk, from region where main stalk passes into hydranth.

*KOBY, E. Monographie des Polypiers jurassiques de la Suisse (part v). Mém. Soc. pal. Suisse, xii (1885), pp. 213-304, pls. lxxiii-lxxxvii.

KOCH, G. v. Ueber das Verhältniss von Skelet und Weichtheilen bei den Madreporen. Morph. JB. xii (1886), pp. 154-160, 1 pl.; J. R. Micr. Soc. vi (5).

Lucid description, and figures of structure and growth of Madreporcs.

*KÖCH, W. Neue Anthozoen aus dem Golf von Guinea. Marburg (Elwert): 1886, 36 pp., 5 pl.

Describes new forms of polypes, collected by Dr. Greëff at Principe, St. Thomé, and Rolas, in Gulf of Guinea. *Alcyonaria*, 1; *Gorgonia*, 3; *Antipathes*, 1; *Actinia*, 5; Madreporcs, 4.

KOEHLER, R. Littoral Fauna of the Anglo-Norman Islands. Ann. N. H. xviii, pp. 362, &c.

— Contribution à l'histoire naturelle des Orthonectidés. C.R. ciii, pp. 609 & 610.

Occurrence of both male and female adults and embryos of *Rhopalura* in same *Ophiura*.

KOROTNEFF, A. *Polyparium ambulans*, n. g. Zool. Anz. ix, pp. 320-324; J. R. Micr. Soc. vi (4), pp. 627 & 628.

Polyparium ambulans, n. g., a remarkable band-like colony, moving like *Cristatella*; upper surface covered by peculiar somewhat *Actinia*-like polyps, without tentacles or septa; lower surface bearing glandular suckers, one for each polyp, communicating like the polyps with lumen of colony, which is divided by muscular transverse partitions.

KRUKENBERG, C. FR. W. Fortgesetzte Untersuchungen über die Skelettine. Z. f. Biol. xxii, pp. 241-260.

Description and analysis of cornein in axis of *Gorgonidae* and *Antipathidae*.

KÜKENTHAL, W., & WEISSENBORN, B. Ergebnisse einer Zoolog. Ausfluges an die Westküste Norwegens. Jen. Z. Nat. xix, pp. 776-789.

LANG, A. *Gastroblasta raffaelli*, Eine durch eine Art unvollständiger Theilung entstehende Modusen Kolonie. Jen. Z. Nat. xix (1886), pp. 735-763, 2 pls.

Gastroblasta raffaelli, n. sp., Naples. Existence of several gastric tubes; no central stomach; budding of new tentacles, marginal vesicles, radial canals, gastric tubes, and gonads on the radial canal; successive and regular right-angled divisions; variations in age and size of homologous organs; no radiate structure; tentacles adradial; marginal vesicles interradial; adult the results of budding plus incomplete divisions; resemblances to *Porpita* and *Velella*. Davidoff's *Phialidium variabile* probably first stage of *Gastroblasta*. Keller's *G. timida*, from Red Sea, has many points of resemblance.

LENDENFELD, R. v. Metamorphosis of *Bolina Chuni*. P. Linn. Soc. N.S.W. ix (1885), pp. 929-931, 2 pls.

— Beroid of Port Jackson. T. c. pp. 968-976; J. R. Micr. Soc. vi, p. 1011.

Neis cordigera, Lesson, quite distinct from *Beroë*. Ova migrate from meridional canals to vascular reticulum, and are there exclusively matured. The "style cells" are "poison thorns."

— Australian *Hydromedusæ*. P. Linn. Soc. N.S.W. ix, pp. 908-924 & 977-983.

— Notes on Australian Coelenterates. Brit. Ass. Rep.; Nature, xxxiv, p. 538.

— Die Süßwasser Coelenteraten Australiens. Eine Faunistische Studie. Zool. JB. ii, pp. 87-108, 1 pl.

— Note on a Medusa from the Tropical Pacific. *Liriope rosacea* (Eschsch.), Ggbr. P. Linn. Soc. N.S.W. x. p. 241.

— Addendum to the Australian *Hydromedusæ*. T. c. pp. 477-480.

— Fourth Addendum to the Australian *Hydromedusæ*. *Hydra hexactinella*, n. sp. T. c. pp. 679-681, 1 pl.

*LORENZ, L. v. Polypomedusen. Polar-Station Jan Mayen. Beobachtungs-Ergebn-herausg. v. d. Akad. Wiss. Wien, Bd. iii.

*MARENZELLER, E. v. Ueber die Sarcophytum benannten Alcyoniden. Zool. JB. Bd. i, pp. 341-368.

3 new species; new genus, *Lobophytum*.

*— Anthozoen. Polar station—Jan Mayen. Beobachtungs-Ergebn herausg. v. d. Akad. wiss. Wien, Bd. iii.

*MARK, E. L. Polyps. Selections from embryological monographs. Mem. Mus. C. Z. ix.

MACMUNN, C. A. Observation on the Chromatology of *Actinia*. Phil. Tr. clxxvi, pp. 641-643, 2 pls.

Actinia mesembryanthemum, &c., contain a pigment (actiniohæmatin), which can be changed into hæmochromogen and hæmatoporphyrin, and

is distinct from actiniochrome. In mesoderm, a green pigment giving all the reactions of biliverdin. The pigment from yellow cells of *Anthea cereus*, *Bunodes beilli*, *Sagartia bellis* is quite different from enterochlorophyll, plant chlorophyll, the chlorophyll of *Spongilla*, or other animal chlorophyll. When "yellow cells" are present there is probably a suppression of those colouring matters which in other *Actiniae* appear to be of respiratory use.

MARSHALL, A. M. Morphology of the Sexual organs of *Hydra*. Stud. Biol. Lab. Owen's Coll. Man. i.

MELLY, W. R., HICKS, J. S., & HERDMAN, W. A. Report on *Hydroids* of the L. M. B. C. District. Fauna Liverpool Bay, pp. 95-113.

METSCHNIKOFF, E. Medusologische Mittheilungen. Arb. z. Inst. Wien, 30 pp., 2 pls.

—. Embryol. Studien an Medusen. Ein Beitrag z. Genealogie der Primitiv Organe. Wien: Holder, imp. 4to, 159 pp., 12 pls.

MÖBIUS, K. Umstülpung von *Hydra*. Tag. Deut. Nat. Vers. p. 133. Regeneration of *Hydra*.

NICHOLSON, H. A. Monograph of the British Stromatoporoids. Part I. Lond. Palæontol. Soc. xxxix, 4to, 130 pp., 11 pls.

—, & ETHERIDGE, R. [JUN.]. On the Tasmanian and Australian species of the genus *Stenopora*, Lonsdale. Ann. N. H. xvii, pp. 173-187, 2 pls.

Diagnosis of *S. ovata*, Lonsdale, *S. australis*, N. & E., *S. tasmaniensis*, Lonsdale, *S. leichhardtii*, n. sp., *S. jackii*, N. & E., *S. informis*, Lonsdale, *S. crinita*, Lonsdale, *S. ? gracilis* Dana sp.

—. On some new or imperfectly described species of Stromatoporoids. T. c. pp. 225-239, 3 pls.

Descriptions of *Actinostroma clathratum*, Nich., *A. verrucosum*, Goldf. sp., *A. hebbornense*, Nich., *A. ? astroites*, Rosen, *A. bifarum*, Nich., *A. stellulatum*, Nich., *A. schmidtii*, Nich., Rosen, *A. intertextum*, Nich.; *Stromatoporella laminata*, Barg. sp., *S. eifeliensis*, Nich., *S. damnomensis*, Nich., *S. arachnoides*, Nich.

—, & FOORD, A. H. On a new genus of Devonian Corals, with description of some species. T. c. pp. 389-400, 2 pls., and pp. 518-523, 1 pl.

Diagnoses of genus *Rhaphidopora*, n. g., *R. crinalis*, Schlüter sp., *R. stromatoporoides*, Schl. sp., with notes on superposed colonies, and specific variations.

—. On some new or imperfectly known species of Stromatoporoids. Op. cit. xviii, pp. 8-22, 2 pls.

Descriptions of *Stromatoporella curiosa*, Berg, *S. granulata*, Nich., *Labechia conferta*, Lonsd. sp., *L. ohioensis*, Nich., *L. canadensis*, Nich. & Murie sp., *L. serotina*, Nich., *L. ? schmidtii*, Nich., *Rosenella dentata*, Rosen sp., *R. macrocystis*, Nich., *R. pachyphylla*, Nich.

NUSSBAUM, M. Naturgeschichte der Genus *Hydra*. Biol. Centralbl. vi (1886), pp. 570-572 [see 1887]; Tag. Deut. Nat. Vers.

Trembley's assertion that in *Hydra* turned inside out endoderm becomes ectoderm, &c., is incorrect; the layers are constant; a new ectoderm formed from tentacles and basal pore.

*Paléontologie française, ou Description de la France. Zoophytes, viii, 2e sér. Paris (G. Masson): 8vo.

*POCTA, P. Notiz über eine neue Korallengattung aus dem böhmischen Cenoman. Verh. geol. Reichsanst. 1886, pp. 119 & 120.

QUELCH, J. J. Report on the Reef-Corals collected by H.M.S. 'Challenger' during the years 1873-76. Chal. Rep. xvi, 203 pp., 12 pls.

N. gg., *Cylloseris*, *Domoseris*, *Moseleya*, *Napopora*, *Physogyra*, *Sandalolitha*, *Tichopora*, *Tichoseris*.

ROMINGER, C. On the minute structure of *Stromatopora* and its allies. P. Ac. Philad. 1886, pp. 39-56.

A criticism of H. A. Nicholson & F. Murie's memoir on *Stromatopora* (1879).

SÄLENSKY, W. Die Urform der Heteroplastiden. Biol. Centralbl. vi, p. 514-525. [See *Protozoa*]

Primitive metazoon volvox-like; archenteron a genitocœle. The blastocœle a new formation.

SCLATER, W. L. *Stephanotrochus moseleyanus*, n. sp. P. Z. S. 1886, pp. 128-136, 3 pls; J. R. Mic. Soc. vi (4), p. 627.

Finest specimen of genus; first in British seas; differs from recorded species in greater development of pali, stouter primary and secondary septa, of which five cycles. The coral suggests that theca is formed from fused peripheral ends of septa. Four cycles of tentacles. Probably dioecious.

STUDER, TH. Ueber Bau und System der achtstrahligen Korallen. MT. Nat. Ges. 1886, pp. xiii & xiv.

TOMES, R. F. On the Occurrence of Two Species of *Madreporaria* in the Upper Lias of Gloucestershire. Geol. Mag. iii, pp. 107-111.

ULRICH, G. O. Contributions to American Palæontology. Vol. I. Cincinnati.

Descriptions, *inter alia*, of New Silurian and Devonian Corals.

USSOW, M. Eine neue Form von Süßwasser Cölenteraten. Morph. JB. xii (1886), pp. 137-153, 2 pls. [Trans., Ann. N. H. xviii, pp. 110-124; J. R. Mic. Soc. vi (5).]

Description of structure and life-history of *Polypodium hydriforme*: (1) a parasite in ova of *Acipenser ruthenus* in the form of a cylindrical, spirally twisted tube, with numerous lateral buds; (2) a free-living stage, equipped with 24, 12, or 6 tentacles, and dividing very frequently; (3) presumably also as a sexual form. A hydroid organism, with a motile 'trophosome,' passing through various asexual generations before

attaining the presumed sexual form. The planula of the latter migrates into the ovum of *Acipenser*, and gradually develops into stolon with buds.

VOGT, C. Sur un nouveau genre de Médusaire sessile (*Lipkea ruspoliana*). Arch. Sci. Nat. xvi. (1886), pp. 356–362; J. R. Micr. Soc. (1887), p. 98.

Lipkea ruspoliana, n. g. (Sardinia coast, 50 fath., attached to *Gorgonia* stem). A new sessile type of Hæckel's *Stauromedusæ*, "with 8 hollow arms, bell fixed by a sucker, continuous circular muscle; no tentacles, but well-developed mucous glands."

WAAAGEN, W. Palæontologia Indica.

Excludes from *Bryozoa* the genera *Chetetes*, *Stenopora*, *Monticulipora*; referred to tabulate Corals.

WILSON, H. V. Parasitic Cuninas of Beaufort. J. Hopk. Univ. Circ. vi, p. 45.

Larvæ of *Cunina* in gastric cavity of *Liriopæ*, and also Cuninas on Cuninas.

GENERAL.

Historical evolution of *Hydromedusæ* (Brooks, W. K.).

Origin of metagenesis (Brooks, W. K.).

Relation of *Porifera* to *Coelenterata* (Heider, K.).

Original forms (Salensky, W.).

Embryology.

Life-history of *Hydromedusæ* (Brooks, W. K.).

Acalephæ (Faxon, W.).

Aurelia aurita and *Cotylorhiza tuberculata* (Goette, A.).

Ontogeny of *Cubomedusæ* (Haacke, W.).

Polyps (Mark, E. L.).

Medusæ. Embryological studies (Metschnikoff, E.).

Histology.

Nematocysts. *Siphonophora* (Bedot, M.).

Histology of *Zoanthus* and *Palythoa* (Koch, W.).

Doubt as to ganglionic nature of cells of *Hydra* described by Jickeli as such; no nucleus demonstrable; perhaps rather like palpoils of *Sarsia*-polyps.

Physiology.

Physiology of *Anthozoa* (Haacke, W.).

Respiratory function of Actinian pigment (MacMunn, C. A.).

Biological Considerations.

Polypodium hydriforme, n. g., parasitic in its early stages within the ova of *Acipenser ruthenus* (Ussow, M.).

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F 3

Cunina larvæ in gastric cavity of *Liriope*, and *Cuninas* parasitic on other *Cuninas* (Wilson, H. V.).

Technique.

Preparation of *Actinozoa* (Braun, M.).

Gorgonia spicules (Cole, A. C.).

Method of treating *Cœlenterata* (F. E. Schulze): paralysis with osmic acid, chloral hydrate, boiling mixture of sublimate and acetic acid in equal parts, gradual influx of fresh water, &c.

GEOGRAPHICAL DISTRIBUTION.

Ceratella fusca (Brazier, J.).

Argentine *Hydromedusæ* (Burmeister, H.).

Liverpool District *Medusæ* and *Ctenophora* (Clubb, J. A.).

Norwegian *Alcyonida* (Danielssen, D. C.).

Mergui Archipelago *Madreporaria* (Duncan, P. M.).

Actiniaria, Liverpool Bay District (Ellis, J. W.).

Gulf Stream *Medusæ* (Fewkes, J. W.).

West African *Stylasterids* (Greef, R.).

Coral-reefs of Solomon Is. (Guppy, H. B.).

Alcyonaria, Liverpool Bay (Herdmann, W. A.).

Channel Island littoral fauna (Koehler, R.).

New *Actinozoa*, Guinea (Koch, W.).

Norwegian forms (Kükenthal, W., & Wissenborn, B.).

Australian *Hydromedusæ* (Lendenfeld, R. v.).

Hydromedusæ of Polar Expedition (Lorenz, L. v.).

Polar *Actinozoa* (Marenzeller, E. v.).

Liverpool Bay *Hydroids* (Melly, W. R., &c.).

Reef-Corals of 'Challenger' Expedition (Quelch, J. J.).

PALEONTOLOGY.

Calcaire à polypiers (Barrois, C.).

Elipsactinia (Canavari, M.).

Astroceninae (Duncan, P. M.).

Madreporaria of Secondary strata, &c. (Duncan, P. M.).

Cyathophyllidæ and *Zaphrentidæ* (Frech, F.).

Cretaceous *Cœlenterates* (de Fromentel).

Corals—fossil forms, U.S. (Hall, J.).

Graptolite family—*Dichograptidæ* (Hermann, O.).

Jurassic polyps (Koby, E.).

Devonian Corals (Nicholson, H. A., & Foord, A. H.).

Stromatoporoids, descriptions of new or imperfectly known species (Nicholson, H. A.).

Stenopora. Diagnosis of new and previously recorded species from Tasmania and Australia (Nicholson, H. A., & Etheridge, R., Jun.).

Fossil Zoophytes (Paléontologie Française).

- New Genus of Coral (Poeta, P.).
Stromatopora (Rominger, C.).
Mudreporaria (Tomes, R. F.).
 New Silurian and Devonian Corals (Ulrich, E. O.).
 Tabulate Corals (Waagen, W.). *Chaetetes*, *Stenopora*, and *Monticulipora*
 are genera of Tabulate Corals, not of *Bryozoa*.

I.—HYDROZOA.

I. HYDROMEDUSÆ.

- Hydromedusæ*. Aetiology of origin of forms like *Hydractinia* from primitive actinula type (Brooks, W. K.).
 Argentine *Hydromedusæ* (Burmeister, H.).
 Liverpool Bay *Medusæ* (Clubb, J. A.).
Polyparium ambulans, n. g., unique band-like colony, from straits near Island of Billiton (Korotneff, A.).
Gastroblasta raffaelei, n. sp. (Lang, A.).
Hydromedusæ. Australian (Lendenfeld, R. v.).
Hydromedusæ. Polar (Lorenz, L. v.).
Polypodium hydriforme, n. g. (Ussow, M.).

HYDRIDÆ.

- Hydra* (Breckenfeld, A. H.).
Hydra hexactinella, n. sp. (Lendenfeld, R. v.).
Hydra. Sexual organs. (Marshall, A. M.).
Hydra. Regeneration (Möbius, K.).
 Natural history of *Hydra* (Nussbaum, M.).

MILLEPORIDÆ.

- Millepora*. Embryos within chitinous capsules in the walls of the canals (Hickson, S. J.)

STYLASTERIDÆ.

- Stylasteridæ* (Greeff, R.).

TUBULARIIDÆ.

- New stalk-formation in *Tubularia mesembryanthemum* (Klaatsch, H.).

PLUMULARIIDÆ.

- Plumulariidæ*, revision of genera; *Sertularella johnstoni* and *Plumularia watsii*, n. spp. (Bale, W. M.)

ANTHOMEDUSÆ.—EUCOPIDÆ.

- Life-history of *Anthomedusæ*, *Turritopsis*, *Eutima* (Brooks, W. K.).
 Anatomy of *Eleutheria* (Hartlaub, Cl.).

LEPTOMEDUSÆ.

- Leptomedusæ* (near *Eucopidæ*), *Irenopsis hexanemalis*, n. g. (Goette, A.): Flat umbrella, 32 tentacles, numerous marginal vesicles, short manubrium, 6 radial canals, rudimentary velum. *Glossocodon hæckelii*, n. sp.

TRACHOMEDUSÆ.—GERYONIIDÆ.

Liriope scutiger and life-history of *Geryoniidæ* (Brooks, W. K.).

Tropical *Medusa*, *Liriope rosacea* (Lendenfeld, R. v.).

NARCOMEDUSÆ.—CLADONEMIDÆ.

Life-history of *Narcomedusæ*; *Cunocantha octonaria* (Brooks, W. K.).

Cuninas parasitic (Wilson, H. V.).

II. SIPHONOPHORA.

Siphonophora. *Veellidæ* and *Physalidæ*. Histology of Nematocysts (Bedot, M.).

Structure and development; Mediterranean forms; synonyms of species (Chun, C.).

III. ACRASPEDA.

Acraspeda. General system (Claus, C.).

Development of *Acalephæ* (Faxon, W.).

Medusæ. New genera: *Nauphantopsis*, *Ephyroides*, *Angelopsis* (new fam., *Angelidæ*), (Fewkes, J. W.).

Medusæ (Goette, A.).

Development of *Aurelia aurita* and *Ootylorhiza tuberculata* (Goette, A.).

Embryological studies on *Medusæ* (Metschnikoff, E.).

STAUROMEDUSÆ.

New *Stauromedusa*—*Lipkea ruspoliana* (Vogt, C.).

CUBOMEDUSÆ.

Cubomedusæ. Ontogeny (Haacke, W.).

DISCOMEDUSÆ.

New Rhizostomatous *Medusa* (*Nectopilema*) (Fewkes, J. W.).

(*Pelagiidæ*) *Sanderia malayensis*, n. g. & sp. (Goette, A.): Discoid umbrella, 32 principal lappets, each divided, 16 sensory organs, 16 tentacles, 32 radial stomachic pouches, short manubrium; *Crossostoma*, n. sp. ?

II.—ACTINOZOA.

GENERAL.

Preparation (Braun, M.).

New *Anthozoa* (Koch, W.).

Actinozoa. Polar (Marenzeller, E. v.).

I. ALCYONARIA.

Liverpool Bay *Alcyonaria* (Herdman, W. A.).

Octocoralla (Studer, Th.).

ALCYONIDÆ.

Norwegian *Alcyonida* (Danielssen, D. C.).

Alcyonida (Jungersen, H. F. E.).

Sarcodictyum catenata, Forbes (Herdman, W. A.).

The Alcyonid known as *Sarcophytum* (Marenzeller, E. v.).

TUBIPORIDÆ.

Clavularia viridis described, placed within new group *Stolonifera*, uniting *Tubipora* and *Cornularia* (Hickson, S. J.).

GORGONIIDÆ.

Gorgonia spicules (Cole, A. C.).

Gorgonia, n. sp. (Koch, W.).

Gorgoniidæ and *Antipathidæ*. Analysis of cornein of axis (Krukenberg, C. F. W.).

II. ZOANTHARIA.

A. ACTINIARIA.

Actiniaria, Liverpool Bay District (Ellis, J. W.).

ACTINIDÆ.

Actinæ. Chromatology (MacMunn, C. A.).

Actinæ, 5 new species (Koch, W.).

ZOANTHIDÆ.

I. Fam. *Zoanthidæ*:—i. Genus *Zoanthus*, two new species described; ii. Genus *Mammilifera*, Lesueur, diagnosis; iii. Genus *Epizoanthus*, Gray, diagnosis, and description of 5 unnamed species; iv. Genus *Palythoa*, Lamouroux, diagnosis, and description of 2 unnamed species; v. Genus *Corticifera*, Lesueur, diagnosis, and description of 2 unnamed species. (Erdmann, A.)

II. Fam. *Sphenopidæ*:—vi. Genus *Sphenopus*, Steenstrupp, defined, with description of 1 unnamed species; vii. New genus defined and described, unnamed. (Erdmann, A.)

Zoanthus and *Palythoa*, histology (Koch, W.).

B. ANTIPATHARIA.

Horny substance of *Antipathidæ* (Krukenberg, C. F. W.).

Antipathes, 1 new species (Koch, W.).

C. MADREPORARIA.

MADREPORARIA.

Madreporia. Anatomy (Fowler, G. H.).

Classification of *Madreporaria* according to formation of theca (Heider, A. R. v.).

Skeletal structure of Madrepores (Koch, G. v.).

Madrepores, 4 new species (Koch W.).

Stephanotrochus moseleyanus, n. sp., British seas (Schlatter, W. L.).

Coral reefs (Dana, J. D.).

Guppy, H. B. Coral Reefs of Solomon Islands. *Nature*, lxxxv, No. 891, pp. 77 & 78.

Reef-Corals of 'Challenger' Expedition (Quelch, J. J.).

For new genera, see list of titles ; 64 n. sp.

EUPSAMMIDÆ.

New species :—*Balanophyllia merguiensis*, *Dendrophyllia coarctata*, *D. (Cænopsammia) affinis* (Duncan, P. M.).

Structure and histology of *Eupsammidæ* (Heider, A. R. v.).

ASTRÆIDÆ.

New species :—*Goniastrea incrustans*, *Solenastrea (Quelchia) spongiormis*, *Leptastrea humilis* (Duncan, P. M.).

TURBINOLIDÆ.

Madreporaria aporosa, *Turbinolidæ*; new species :—*Paracyathus andersoni*, *P. profundus*, *P. indicus*, *P. cæruleus*, *P. merguiensis*, = *Polycyathus verilli*, *P. difficilis* (Duncan, P. M.).

III.—CTENOPHORA.

Deiopea kaloktenota (Claus, C.).

Liverpool Bay Fauna (Clubb, J. A.).

Bolina chuni, metamorphosis (Lendenfeld, R. v.)

Neis cordigera, Lesson, redescribed (Lendenfeld, R. v.).

SPONGIÆ.

BY

PROFESSOR W. J. SOLLAS, M.A., D.Sc., LL.D.

GENERAL REMARKS.

THE most important work of the year is Schulze's account (34) of the structure and classification of the *Hexactinellida*; nothing approaching it in clearness and completeness has appeared since the "Kalkschwämme" of Hæckel; a long abstract is given on pp. 10-15. Next in interest to the general zoologist is Heider's detailed and complete description of the development of *Oscarella lobularis*, Sdt.; of this (12) a full abstract is given on pp. 6-9. Ridley & Dendy (33) publish a preliminary Report of the 'Challenger' Monaxonids, with a revised classification of the group; an abstract appears on pp. 16-19. Vosmaer (41) concludes his important work on the *Porifera* in Bronn's Thierreichs. Attention is also directed to Lendenfeld's description of the vestibule of *Raphyrus hixonii*, n. sp., in which he discovers another instance of a nervous structure in Sponges; to Dendy & Ridley's (4) description of *Proteleia sollasi*, n. g. & sp., a Suberite in which Tetractinellid-like anatrienes occur; and, finally, to Goette's account of the development of *Spongilla fluviatilis*. The remaining papers are of special rather than general interest.

1. CARTER, H. J. Descriptions of Sponges from the Neighbourhood of Port Philip Heads, South Australia (continued). Ann. N. H. (5) xvii, pp. 40-53, 112-127, 431-441, 502-516, & xviii, pp. 34-55 & 126-149.
 2. —. Supplement to the Descriptions of Mr. J. R. Wilson's Australian Sponges. *Op. cit.* (5) xviii, pp. 271-379 & 445-466, pl. x.
 3. CHOFFAT, PAUL. Note sur la distribution des bancs de Spongiaire à spicules siliceux dans la chaîne du Jura et sur le parallélisme de l'Argovien. Bull. Soc. géol. (3) xiii, pp. 834-841.
 4. DENDY, A., & RIDLEY, S. O. On *Proteleia sollasi*, a new Genus and Species of Monaxonid Sponges, allied to *Polymastia*. Ann. N. H. (5) xviii, pp. 24 & 152-159.
- & —. Preliminary Report of the *Monaxonida* collected by H.M.S. 'Challenger.' *T. c.* pp. 325-351 & 470-493. [See (33).]

5. DUNCAN, P. M. On the Genus *Hindia* and its Species. Ann. N. H. (5) xviii, pp. 226-228.
6. DYBOWSKI, W. Mittheilungen ueber die aus dem Flusse Niemen stammende *Trochospongilla erinaceus*, Ehrbg. SB. Ges. Dorp. vii, pp. 295-298.
7. —. Kollekcya gabek z morka Ochockiego. (A Collection of Sponges from the Sea of Okhotsk.) Wszechswiat, iii (1884), p. 175.
8. FRANTIŠEK, PE. Dodatky ku fauně českých hub sladkovodních. (Contribution to the Fresh-water Sponge Fauna of Bohemia.) SB. böhm. Ges. 1886, pp. 147-174, 1 pl.
In Bohemian, with *resumé* in German.
9. GIBSON, R. J. H. On a New Species of *Sycandra*. First Rep. Fauna Liverpool Bay, pp. 364-367.
10. GOETTE, A. Untersuchungen zur Entwicklungsgeschichte der Thiere. Pt. iii. Untersuchungen zur Entwicklungsgeschichte von *Spongilla fluviatilis*. Hamburg & Leipzig (Leop. Voss): 64 pp., 5 pl.
11. —. Nachträgliche Bemerkungen zur Entwicklungsgeschichte der Schwämme. Zool. Anz. ix, pp. 292-295.
12. HEIDER, CARL. Zur Metamorphose der *Oscarella lobularis*, O. Schmidt. Arb. z. Inst. Wien, vi, pp. 175-236.
13. HINDE, G. J. On Beds of Sponge-remains in the Lower and Upper Greensand of the South of England, Phil. Trans. 1886, pp. 403-453, pls. xl-xlv.
14. —. On the Sponge-spicules from the Deposits of St. Erth. Q. J. Geol. Soc. xlii, p. 214.
15. HIGGIN, T. Report of the *Porifera* of the L. M. B. C. District. First Rep. Fauna Liverpool Bay, pp. 72-94.
16. KOEHLER, R. Sur le fauna littoral des Isles Anglo-Normans. Ann. Sci. Nat. (6) xx, p. 62; transl., Ann. N. H. (5) xviii, pp. 236, 237, 301, 302, & 357, 360, & 362.
17. LAKSCHEWITZ, PAUL. Ueber die Kalkschwämme Menorca. SB. Ges. Dorp. vii, pp. 336-341; Zool. JB. i, pp. 297-310 [Ann. N. H. (5) xvii, pp. 536-539].
18. LAMPE, W. *Tetilla japonica*, eine neue Tetractinellidenform mit radiarem Bau. Arch. f. Nat. (2), 52 jhg. pp. 1-18, pl. i; abstr. J. R. Micr. Soc. (2) vi, pp. 1000 & 1001.
19. LENDENFELD, R. v. Studies on Sponges. P. Linn. Soc. N.S.W. x. pp. 557-574.
20. —. An *Alga*, forming a Pseudomorph of a Siliceous Sponge (*Dactylochalina australis*, n. sp.). T. c. pp. 726-728.
21. —. Second Addendum to the Monograph of the Australian Sponges. T. c. pp. 845-850.
22. —. Contributions towards the Knowledge of the Nervous and Muscular Systems of the Horny Sponges. Transl., Ann. N. H. (5) xvii, pp. 372 & 373. [Cf. Zool. Rec. xxii, *Spong.* p. 2.]

23. MARENZELLER, E. v. *Porifera, Anthozoa, Ctenophora, and Worms of Jan Mayen*, D. Internationale Polarforschung 1882-83, D. Oesterr. reichische Polarstation Jan Mayen iii, pp. 1-6.
24. MATTHEW, G. F. *Illustrations of the Fauna of St. John's Group*. Tr. R. Soc. Canada, iv (1885), pp. 29 & 30.
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ANATOMY.

SCHULZE (34) describes the structure of the *Hexactinellida*. Beneath wide differences in detail, they present a fundamental similarity of structure, so that it is easy to construct for all known forms a common scheme. Disregarding the hard parts, they consist of a simple sac, the outer surface of which is formed of a thin poriferous skin—the dermal membrane; beneath this is a cavity traversed by fine trabeculae—the subdermal trabecular space; this is succeeded by the flagellated chamber-layer. The chambers, one layer thick, lie close together, with their convex-closed ends turned towards the exterior and their open mouths towards the interior; their wall is a reticulate membrane perforated by the chamber pores. As a direct process of the chamber wall, the “connecting membrane” extends from the mouths of the chambers, closing the spaces which remain between them. The chambers open into a cavity broken up by trabeculae—the subgastral trabecular space—which is separated from the large gastral cavity by porous or reticulate membrane—the gastral membrane.

Of these five layers every Hexactinellid is composed; but modifications of form may occur, so that the gastral and dermal faces are not to be distinguished by their position with respect to the centre of the Sponge body, but rather by the fact that the dermal membrane is that through which water enters to the interior, and the gastral that through which it leaves it.

As modifications, the simplest is a simple elongation of the sac into a pouch, accompanied by a peculiar folding of the chamber-layer, which becomes evaginated towards the smooth dermal skin. In forms resembling a thick walled cup or bowl, the folding of the chamber-layer has proceeded further, fresh evaginations arising, till, finally, branched excurrent canals of circular transverse section are produced, between which corresponding complicated branched incurrent canals extend from the subdermal trabecular space. The gastral membrane either extends over all the gastral openings of the excurrent canals as a smooth sieve net, and so forms the boundary of the simple gastral cavity, or it enters niche-like recesses of the wall, or finally it enters the excurrent canals through their wide gastral openings, and lines their surface up to the very end of their terminal branches.

A further variation is produced by the closure of the simple mouth of the sponge-sac by a terminal sieve plate.

The body-wall of the sac is frequently perforated by more or less regularly arranged gaps, which place the gastral cavity in direct communication with the exterior.

Striking alterations of form are not seldom produced by the development of a stalk, as a direct process of the lower end of the sac.

Through an expansion of the upper end and of the oscular opening many species acquire a funnel shape. Further widening out and flattening convert this into a flat disc; or, if the growth is one-sided, into an ear shape; or, may be, into a simple vertical plate. Again, by folding

or lateral finger-like evaginations, the calyx-wall may become complicated, as in *Aphrocallistes bocagii*, in which the gastral cavity is divided into several chambers (one lying behind the other) by net-like diaphragms.

If in a stalked originally calyciform example the outer edge turn down after complete opening out of the cup, a mushroom form originates. Thus the original gastral cavity disappears, and the original gastral surface becomes the upper and outer surface of the Sponge. This process may be carried still further, the oscular edge continuing to turn down till it produces a cylindrical or nearly hemispherical body, the outer surface of which is gastral, and continuous with that which lines the cavity of the tubular stalk.

In many *Dictyonina* the sac-like form elongates, without any considerable thickening of the wall, to form thin walled tubes, which then become branched, often dichotomously, and subsequently the neighbouring branches anastomose and so form a tubular plexus, from which numerous terminal branches project, each with a single oscular opening.

A funnel-shaped form sometimes gives rise to lateral tubes which branch and anastomose (ex. gr. *Periphragella*): or a system of anastomosing tubes, which open to the exterior, may enclose a central cavity, with which they may or may not be in communication; this cavity is a Pseudogaster. In such forms there sometimes occurs, covering the whole exterior, a special capsule or investing layer, which forms a sieve-net over the incurrent openings, and a sieve-plate over the oscules (ex. gr. *Semperella*).

Genital products occur in the connective tissue of the sub-dermal cavity; the sperm-balls resemble those of other Siliceous Sponges, such as *Reniera* and *Spongilla*. The ova are at first scarcely, or not at all, to be distinguished from connective tissue cells, but are recognized later by their considerable increase in size and by the appearance of numerous yolk-granules, as well as by the enlargement of the nucleus, which in some cases, instead of lying in the interior, is situated in a depression of the surface of the ovum. Segmentation stages were not seen.

In some species multiplication by budding occurs. This may be well studied in *Polyophus philippinensis*. Conical processes bearing a bundle of gently diverging spicules project from the lateral surface, they increase in size and become teat-shaped, the base becomes constricted, the outer part pear-shaped; the pear-shaped part in particular enlarges, a round opening appears at the distal pole, while from the lateral surface conical elevations, bearing projecting bundles, and irregularly distributed, arise, and thus cause the bud to resemble the parent. The connecting stalk becomes longer and thinner, and finally can no longer support the bud, which is set free. Should the buds remain in union, there would result a branched stock with branched stem, such as O. Schmidt has described in *Sympagella nux*. Young buds are particularly valuable in affording an insight into the general structure of the grown-up Sponge; longitudinal sections show with particular clearness the relations of the folded chamber-layer to the canal system.

LAMPE (18) describes the anatomy of a new species of *Tetilla* (*T.*

japonica), which is characterized by sexradiate symmetry, the six chief excurrent canals being constantly six in number.

LENDENFELD (19) describes the anatomy and histology of *Dendrilla cavernosa*, n. sp., and *Raphyrus hixonii*, n. sp. The "vestibule" of the former is closed by a poriferous membrane which merits detailed description. Ectodermal epithelium occurs on both inner and outer faces, investing a gelatinous matrix containing cellular elements; the pores are very short conical tubes, widest outwards, at their inner ends a number of fusiform cells radiate from the circular margin inwards towards amœboid cells, from which fine processes extend outwards in every direction. Lendenfeld regards the latter cells as ganglionic, the former as sensitive. Farther away from the pore fusiform muscle cells and amœboid wandering cells occur, and beneath the general epithelium gland cells.

LENDENFELD (20) also describes the complete replacement of the soft parts of *Dactylochalina australis*, n. sp., by an *Alga* (Floridean?).

RIDLEY & DENDY (4) describes the structure of *Proteleia sollasi*, a Suberite of considerable interest, as possessing small anchor-like spicules, which project from the cortex like those of some Tetractinellid Sponges.

ONTOGENY AND PHYLOGENY.

HEIDER (12) gives a full and circumstantial account of the development of *Oscarella lobularis* from the blastula stage to that of the Rhagon:—

(a) *The blastula*.—In this stage the larvæ escape from the parent in great numbers during the months of October and November, usually at night. They are egg- or pear-shaped, but undergo transitory changes of form, sometimes shortening and broadening, at others lengthening out. For days they swim about freely, now and again attaching themselves to fixed objects or the surface of the water.

(b) *Histology of the blastula*.—It consists of a single layer of long prismatic flagellated cells, which enclose a central cavity, filled with a non-cellular, granular, albuminoid fluid. The cells consist for the greater part of their length of coarsely granular and pigmented endoplasm; the remaining distal part is a clear, or sometimes faintly granular, exoplasm, which is more hyaline and refringent at the surface than deeper in. This is produced into a collar, which does not differ from that of the collared cells of the flagellated chambers of the adult except in being somewhat shorter. From the middle of the end of the cell a long fine flagellum extends, which can be traced inwards into continuity with a sheath of somewhat denser plasma which surrounds the nucleus. Besides the prismatic cells, others of a pear- or flask- shape sparingly occur; these are devoid of a flagellum, but provided with exceptionally high collars. The cells of the blastula do not lie in actual contact, but are separated by a small quantity of intercellular substance, probably of the same nature as the gelatinous fluid of the central cavity.

(c) *The free-swimming gastrula stage*.—The posterior red-coloured end of the blastula is, as a rule, invaginated within the yellow anterior moiety;

but sometimes, though rarely, the order is reversed. On first escaping from the parent the blastula seeks the light; but on the approach of gastrulation, which usually occurs towards evening, it avoids it. The gastrula is very quickly formed, and is at first hemispherical; the blastula cavity is not completely obliterated, but remains as a considerable space between the two layers, which retain at first the same structure as they possessed in the blastula. The blastopore is a wide circular opening, the cells surrounding it of the same character as all the rest.

(d) *Stage of attached Gastrula.*—Almost immediately after invagination the gastrula attaches itself by the margin of the blastopore. It then becomes depressed, and broadens out into a flat cap-like form, it grows clearer, pigment disappears from the ectoderm and is more uniformly distributed in the endoderm. The ectoderm and endoderm are now histologically differentiated: the cells of the latter still resemble those of the blastula, except that their basal portion is no longer sharply defined against the albuminoid jelly, and their collars have grown longer; the cells of the ectoderm have undergone great changes, they are no longer prismatic but cubical, the distinction between exo- and endo-plasm is abolished, the cell is more hyaline and less granular, and its outer face shows a cuticular thickening, the nucleus has retreated to the base, the collar has disappeared, but the flagellum is retained.

(e) *Commencement of the closure of the blastopore.*—The blastopore grows narrower, and by the uniform extension of its margin inwards the gastral cavity becomes bounded below; simultaneously the endoderm commences to undergo a process of folding which finally results in the formation of the system of flagellated chambers. *Pseudopodia*-like processes of attachment are now seen extending from the margin of the larva; which has now a flat cake-like form, with rounded edges and a flat summit.

(f) *Morphological differentiation of the endoderm.*—While the blastopore still remains large, the endoderm grows into a discontinuous fold, which runs parallel with the margin of the gastral sac, with its greatest extension towards the aboral pole. Next radial folds appear, which extend from the sides inwards, septa-like. The blastopore is now considerably narrower. The radial folds are next transversely segmented into an inner and outer portion: thus result two concentric circular rows of diverticulæ—the rudiments of the flagellated chambers. A similar arrangement of the flagellated chambers at a corresponding stage is described by Schulze in *Placina*.

(g) *Further changes up to the closure of the blastopore.*—The distinction between the cells of the flagellated chambers and those lining the gastral cavity is now established. All the cells have now lost their prismatic form, and none contain yolk-granules. The cells of the chambers are flask- or pear-shaped, with high collars, and a basally situated nucleus; the others, lining the general cavity, are cubic, with a round, centrally situated nucleus, without a collar, but still possessing a flagellum, indeed, it would seem that flagella are not retracted from the cells generally at any stage of the development. The albuminoid jelly of the blastula cavity has increased in bulk, and fills a considerable space at the edge of

the flat, cake-like larva. The mesoderm now arises by the inwandering of cells derived by fission from the endoderm. This appears to follow from the fact that the earliest observed mesodermal cells occur near the endoderm, that the young mesoderm cells are structurally more similar to the endodermal than to the ectodermal cells, that forms were observed which seemed to suggest an alteration of endodermal into mesodermal cells, while ectodermal cells never presented these appearances.

The ectoderm forms regular little feet for the attachment of the Sponge; these commence as short conical processes, which extend into irregular tentacles, and run out in various directions seeking points of attachment; some broaden out into round, sucker-like feet, the ectodermal cells on the face of which are longer than usual, and resemble gland cells; probably they secrete a cement for attachment—indeed, such a cement appears to cover the surface to which they adhere. A difference between the cells forming the margin of the blastopore could not be proved by thin slices, but they appear to be larger than the other ectoderm cells.

(h) *Definite formation of flagellated chambers.*—The flat, cake-like larva increases chiefly in height, and becomes hemispherical, owing to the filling of the gastral cavity with fluid (sea-water, containing some dissolved albumen). The ectoderm becomes smoother, irregular processes of attachment disappear, the cells become flatter, and pass into pavement epithelium, except those of the basal part, which, in some other places besides the feet, retain a cubical form. Inside the inner circle of diverticula, at the summit of the gastrula, the endoderm remains unfolded (the oscular plate); at the base of the larva it is also unfolded (basal endodermal plate). The flagellated chambers have now acquired complete histological differentiation and a definite spherical form; their communication with the gastral cavity is constricted to a wide circular or oval opening. Pores now form as short invaginations of the ectoderm, though in many cases the distal end of the flagellated chamber and the surface of the ectoderm approach so closely that no invagination is needed, and simple perforation occurs: in other cases—and here, as in *Placina*, these are the rule—a single pore canal serves two chambers and opens on the surface in a single aperture between them; such are formed by invagination. Isolated flagellated chambers have been observed on the basal layer of endoderm.

(j) *Formation of the oscule.*—The ectoderm at the summit of the hemispherical gastrula rises up from the underlying endoderm, and a continually increasing quantity of jelly gathers between them: thus arises a solid process, which rises vertically upwards, but otherwise resembles one of the marginal tentacular processes for attachment. Soon a diverticulum from the endoderm grows into this, the intervening jelly is displaced, the ecto- and endoderm meet together at the summit, fusion and perforation follow, and the oscule is the result.

(k) *Theoretical part.*—The development of *Oscarella* is typical; the amphiblastula of the *Calcarea* is coenogenetic. The invaginated layer of the gastrula is the nutritive layer. The ancestral form of Sponge was a flat gastrula, which lived, crawling mouth downwards, over the surface

of stones, feeding on the various kinds of organisms which affect these surfaces; the flattened, cap-like form of the gastrula at one stage suggests so much (*Trichoplax* is mentioned in connection with this). It is to be borne in mind that flagella persist throughout life in connection both with ectoderm and endoderm in *Oscarella*, and that attachment of the gastrula only occurs at single points of the margin, so that the flagella of the ectoderm will bring nutrient particles to the Sponge, and these will then be carried into the gastral cavity through the split-like interspace between the basal layer and the edge of the mouth. The pores (secondary polystomy) may have been produced by diffusion streams at the points where the ectoderm and endoderm were in contact; thus, at first respiratory, they would, from their advantageous position, come to function as mouth openings, and the original mouth would close up; the formation of the oscule (a character *sui generis*) then becomes a difficulty.

The sponges are genuine *Metazoa*, and the two primary layers are truly homologous with those of higher types; but they are not *Cœlentera*, there is a diametrical opposition between the two groups, as ontogeny teaches, for the gastrula in one attaches itself by the oral pole, and in the other by the aboral. The animal part of the Sponge undergoes but slight differentiation as compared with that of the *Cœlentera*: there are no grasping organs (tentacles), no true muscle fibres (the contractile fusiform cells of the Sponges cannot be so regarded, since the contractile substance is not yet differentiated from the rest), and no nervous system (the arguments of Lendenfeld are inconclusive); there is also an absence of nematocysts. Finally, the symmetry of the Sponges is lower than that of the *Cœlentera*. The two groups agree in the blastula and gastrula stages, but no further; hence the Sponges are a separate type—the *Porifera*.

GOETTE (10) obtains very different results from his investigation of *Spongilla fluviatilis*; unfortunately the memoir is too long to abstract. The following are some of the conclusions:—(a) The ripe egg is the product of one or several cells, which fuse to form a new Monoplastid. (b) From the egg proceeds a sterroblastula; this gives rise to a sterrogastrula, consisting of a small-celled ectoderm, enclosing a large-celled endoderm, which encloses an eccentric cavity (endoderm cavity). (c) The embryo, by ciliation of the ectoderm, becomes the larva, which undergoes its metamorphosis within the parent, during swarming or after attachment. (d) In the metamorphosis the ectoderm is completely lost, and the actual Sponge proceeds entirely from the endoderm. (e) Its peripheral layer serves for the attachment of the Sponge, and then produces over the whole surface the epidermis; at its base it passes into the endoderm mass; the pores and oscules are cell-gaps of this layer. (f) In the endoderm mass, the flagellated chambers develop independently of each other and of other cavities by the budding of single cells, the canals and subdermal cavities arise as tissue-gaps, which are lined by epithelium derived from wandering cells. The spicules are intercellular formations.

An account is given of the development of the gemmules, and the

remainder of the work is comparative; the general ontogeny of the Sponges is discussed, along with other theoretical questions. As regards the systematic position of the Sponges, the author states that "their Cœlenterate nature, or their near relationship with the *Cœlentera*, is in no way supported by their developmental history. They are probably an independent phylum developed from the oldest Heteroplastids by degeneration."

GOETTE (11) criticises some of the conclusions arrived at by Heider. The disappearance of the ectoderm during development (Metschnikoff, Marshall, Schmidt, Goette), the isolated formation of flagellated chambers (Barrois, Keller, Goette), show that the ontogeny of *Oscarella* is not typical of Sponges in general. Even if all other of Heider's conclusions be correct, it does not follow that the germinal layers of the Sponges can be homologised with those of other *Metazoa* on Heider's scheme. The flagellated epithelium of *Sycandra* proves by its origin and development that it is ectoderm. Heider determines the homology of layers, not by their origin, but by their fate. Exceptionally in worms, an embryological separation of ectoderm into enteroderm and mesoderm fails (*Acœla*, *Dendroœala*), or the ectoderm becomes lost (*Trematodes*, *Cestodes*): but in Sponges (except *Oscarella*) this is the rule; they unite a want of differentiation with degeneration.

SOLLAS (37) states that Heider is mistaken in supposing that the structure of the embryos of *Oscarella*, observed by the former, can be explained by artificially produced wrinkling or shrivelling.

VOSMAER (41) gives an account of our present knowledge of the ontogeny of Sponges; pp. 411-430.

PHYSIOLOGY.

VOSMAER (41) devotes a chapter to this subject; pp. 431-445.

CLASSIFICATION.

SCHULZE (34) proposes the following classification of the Sponges and of the *Hexactinellida* :—

Type, PORIFERA.

Class I. CALCAREA.

Class II. NON-CALCAREA.

Subclass 1. *Ceratosa*.

Subclass 2. *Silicea*.

Order 1. *Monaxonina*.

Order 2. *Tetragonina*.

Order 3. *Triaxonina* or *Hexactinellida*. Sponges with very loose soft body, in which isolated or siliceous spicules of the triaxial type, or of reductions from this type, occur either isolated or united into a solid framework by siliceous cement.

Subord. 1. *Lyssacina*, Zittel. *Hexactinellida*, in which the spicules always remain isolated, or subsequently are partly united by silica in an irregular manner.

Tribe 1. *Hexasterophora*, F. E. S. Hexasters constantly occur in the parenchyma. The chambers are sharply separated from each other : thimble-shaped.

Fam. 1. *Euplectellidæ*. Thin walled sac tubes or sacs, with dagger-shaped hexacte hyperdomalia, having a long proximal ray.

Subfam. 1. *Euplectellinæ*. Tubular, with terminal transverse sieve-plate. In the lateral wall circular gaps, more or less regularly arranged. On the projecting distal ray of the dagger-shaped hexacte-hypodermalia a floricome is situated.

Genus 1. *Euplectella*, Owen (p. 37).

Species i, *E. aspergillum*, Owen; ii, *E. suberea*, Wy. Th.; iii, *E. cucumer*, Owen; iv, *E. jovis*, O. Sdt.; v, *E. oweni*, Marshl.; vi, *E. crassistellata*, F. E. S.; vii, *E. nodosa*, F. E. S.

Genus 2. *Regadrella*, O. Sdt. A tube attached by a knotty basal part; discohexasters in the parenchyma (p. 39).

Species i, *R. phoenix*, O. Sdt.

Subfam. 2. *Holascinæ*, F. E. S. Tubular; without gaps in the wall; without superficially situated floricoes.

Genus 1. *Holascus*, n. g., F. E. S. (p. 39).

Species i, *H. stellatus*, n. sp.; ii, *H. fibulatus*, n. sp.; iii, *H. polejaevi*, n. sp.; iv, *H. ridleyi*, n. sp.

Genus 2. *Malacosaccus*, n. g. (p. 41).

Species i, *M. vastus*, n. sp.; ii, *M. unguiculatus*, n. sp.

Subfam. 3. *Tægerinæ*, F. E. S. The wall of the sac or tube-shaped body is perforated by gaps of different dimensions, irregularly shaped and distributed. Reticulate trabeculæ of the skeleton of the wall form an irregular framework of principalia partly cemented together. On each distal ray of the dagger-shaped hypodermal hexactes is seated a floricome.

Genus 1. *Tægeria*, n. g. (p. 41).

Species, *T. pulchra*, n. sp.

Genus 2. *Walteria*, n. g. (p. 42).

Species, *W. flemmingii*, n. sp.

Genera, the exact position of which is uncertain, but allied to the *Euplectellidæ*.

Genus 1. *Habrodictyon*, Wy. Th., p. 42.

Species i, *H. speciosum*, O & G.

Genus 2. *Eudictyon*, Marshall, p. 43.

Species i, *E. elegans*, Marshl.

Genus 3. *Dictyocalyx*, n. g., p. 43.

Species i, *D. gracilis*, n. sp.

Genus 4. *Rhabdodictyum*, O. Sdt., p. 43.

Species i, *R. delicatum*, O. Sdt.

Genus 5. *Rhabdoplectella*, O. Sdt., p. 43.

Species i, *R. tintinnus*, O. Sdt.

Genus 6. *Hertwigia*, O. Sdt., p. 44.

Species i, *H. falcifera*, O. Sdt.

Genus 7. *Hyalostylus*, n. g., p. 44.

Species i, *H. dives*, n. sp.

Fam. 2. *Asconematidae*. The dermal and gastral skeleton characterized by pentacte or hexacte pinuli, the free projecting radial ray of which is covered by spines or scales, pine-tree like. The hypodermalia and hypogastralia are pentactes; attached; with parenchymal discohexasters.

Subfam. 1. *Asconematine*. Cup-, funnel-, or tube-shaped. The wall is a loose, thin plate.

Genus 1. *Asconema*, Sav. Kent, p. 44.

Species i, *A. setabulense*, Sav. Kent.

Genus 2. *Aulascus*, n. g., p. 45.

Species i, *A. johnstoni*, n. sp.

Subfam. 2. *Sympagelline*. Ovoid, thick walled, usually stalked cups, with smooth, thin, upper edge. In the parenchyma little discohexasters lie between the principal hexactes and long diactes.

Genus 1. *Sympagella*, O. Sdt., p. 45,

Species i, *S. nux*, O. Sdt.

Genus 2. *Polyrhabdus*, n. g., p. 45.

Species i, *P. oviformis*, n. sp.

Genus 3. *Balanites*, n. g., p. 45.

Species i, *B. pipetta*, n. sp.

Subfam. 3. *Caulophacine*. Mushroom-shaped, with long, cylindrical, hollow stalk.

Genus 1. *Caulophacus*, n. g., p. 46.

Species i, *C. latus*, n. sp.; ii, *C. elegans*.

Genus 2. *Trachycaulus*, n. g., p. 46.

Species i, *T. gurlitti*, n. sp.

Fam. 3. *Rosellidae*. The dermalia have no distal radial ray.

Genus 1. *Lanuginella*, O. Sdt., p. 47.

Species i, *L. pupa*, O. Sdt., p. 47.

Genus 2. *Polyophus*, n. g., p. 47.

Species i, *P. philippinensis*, Gray, p. 47.

Genus 3. *Rossella*, Carter, p. 47.

Species i, *R. antarctica*, Crtr.; ii, *R. veluta*, Wy. Th.: p. 48.

Genus 4. *Acanthascus*, n. g., p. 48.

Species i, *A. grossularia*, n. sp.; ii, *A. dubius*, n. sp.; iii, *A. cactus*, n. sp.: p. 49.

Genus 5. *Bathydorus*, n. g., p. 49.

Species i, *B. fimbriatus*, n. sp.; ii, *B. stellatus*, n. sp.;
iii, *B. spinosus*, n. sp., p. 50; iv, *B. baculiferus*.

Genus 6. *Rhabdocalyptus*, n. g., p. 51.

Species i, *R. mollis*, n. sp.; ii, *R. ræperi*, n. sp., p. 51.

Genus 7. *Crateromorpha*, Gray, p. 52.

Species i, *C. meieri*, Gray; ii, *C. thierfelderi*, n. sp.;
iii, *C. murrayi*, n. sp.; iv, *C. tumida*, n. sp.

Genus 8. *Aulochone*, n. g., p. 54.

Species i, *A. cylindrica*, n. sp.; ii, *A. lilium*, n. sp.: p. 55.

Genus 9. *Caulocalyx*, n. g., p. 55.

Species i, *C. tener*, n. sp., p. 55.

Genus 10. *Aulocalyx*, n. g., p. 56.

Species i, *A. irregularis*, n. sp., p. 56.

Tribe 2. *Amphidiscophora*. F. E. S. Amphidiscs constantly present in the outer skin. In the parenchyma hexasters fail completely. A basal tuft of fibres, by which the Sponge is anchored in the mud, constantly present. The chambers no longer thimble-shaped and sharply separated from each other, but simply somewhat irregular evaginations of the membrana reticularis.

Fam. 1. *Hyalonematidae*, F. E. S. Pentacte pinuli occur both in the dermal and gastral membrane.

Subfam. 1. *Hyalonematinae*, F. E. S. The cylindrical, generally cup-shaped, body has on the upper side a more or less sharply margined roundish excurrent region—oscular area—and is only exceptionally laterally cleft.

Genus 1. *Hyalonema*, Gray sp., p. 57.

Subgen. 1. *Hyalonema*, s. str.

Species i, *H. sieboldii*, Gray; ii, *H. gracile*, n. sp.;
iii, *H. divergens*, n. sp.; iv, *H. toxeres*,
Wy. Th.; v, *H. kentii*, O. Sdt.; vi, *H.*
poculum, n. sp., p. 59; vii, *H. conus*, n. sp., p. 59.

Subgen. 2. *Stylocalyx*, n. subg., p. 59.

Species i, *S. thomsonii*, Marshl.; ii, *S. apertus*, n. sp.;
iii, *S. depressus*, n. sp.; iv, *S. claviger*, n. sp.;
v, *S. globus*, n. sp.; vi, *S. elegans*, n. sp.;
vii, *S. tener*, n. sp.

Species of *Hyalonema* not referable to either of the preceding sub-genera: i, *H. lusitanicum*, Bocage; ii, *H. cebuense*, Higgin; iii, *H. tenue*, n. sp.; iv, *H. robustum*, n. sp.

Genus 2. *Pheronema*, Leidy, p. 63.

Species i, *P. annæ*, Leidy; ii, *P. carpenteri*, Wy. Th.;
iii, *P. grayi*, Sav. Kent; iv, *P. hemispherica*,
Gray; v, *P. globosum*, n. sp.; vi, *P. giganteum*, n. sp.

Genus 3. *Poliopogon*, Wy. Th., p. 66.

Species i, *P. amadou*, Wy. Th. ; ii, *P. gigas*, n. sp.

Subfam. 4. *Semperellinæ*, F. E. S.

Genus 1. *Semperella*, Gray, p. 67.

Species i. *S. schultzei*, Semper.

Subord. 2. *Dictyonina*, Zittel. *Hexactinellidæ* in which the larger parenchymal hexactes are from the first united together into a composite rigid skeleton.

Tribe 1. *Uncinataria*, F. E. S. With uncinate fails only in *Euryplegma auricularis*).

Subtribe 1. *Clavularia*, F. E. S. Beside the pentacte hypodermalia and hypogastralia occur groups of radiately arranged clavulæ.

Fam. 1. *Farreidæ*, Gray. The dictyonal skeleton forms in the youngest parts of the body a one-layered net with quadratic meshes, from the nodes of which on both sides proceed conical spines.

Genus 1. *Farrea*, Bwk., p. 69.

Species i, *F. occa* (Bwk.), Carter ; ii, *F. sollasi*, n. sp. ; iii, *F. vosmari*, n. sp. ; iv, *F. clavigera*, n. sp.

Subtribe 3. *Scopularia*, F. E. S. Beside the pentacte hypodermalia and hypogastralia occur radially disposed scopulæ (except in *Euryplegma auriculare*, in which not only uncinate but scopularia also quite fail).

Fam. 2. *Euretidæ*, F. E. S. Branched and anastomosing-tubes, which form either an irregular structure of nearly equal tube-width, or the walls of a cup. The dictyonal skeleton is, from the beginning, several-layered, so that a one-layered net is never met with at the ends of the tubes.

Genus 1. *Eurete* (Semper), Crtr., p. 70.

Species i, *E. semperi*, n. sp. ; ii, *E. schmidtii*, n. sp. ; iii, *E. farreopsis*, Crtr. ; iv, *E. carteri*, n. sp. ; v, *E. marshalli*, n. sp. ; vi, *E. bowerbankii*, n. sp.

Genus 2. *Periphragella*, Marshall, p. 72.

Species i, *P. elisæ*, Marshl.

Genus 3. *Lefroyella*, Wy. Th., p. 73.

Species i, *L. decora*, Wy. Th.

Fam. 2. *Melittionidæ*, Zittel. Having the form of a branched tube, or a cup, with lateral blind sac-like evagination. The dictyonal skeleton forms honeycomb-like, tolerably regular, six-sided, perforate wall-cells, in each of which a funnel-like extension of the membrana reticularis is set transversely across the lumen, while the outer ends on the outside are covered by the investing dermal skin, and on the inside by the gastral membrane. Scopulæ are absent from the gastral skeleton.

Genus 1. *Aphrocallistes*, Gray, p. 74.

Species i, *A. bocagei*, Perc. Wright; ii, *A. beatrix*, Gray;
iii, *A. vastus*, n. sp.; iv, *A. ramosus*, n. sp.

Fam. 3. *Coscinoporidæ*, Zittel. The plate-like wall of the cup, bowl-, or table-shaped attached body, is transversely perforated by more or less longitudinally-disposed, funnel-shaped, straight canals, which open alternately on the one and the other side of the wall, beneath the sieve-like investing membrane; at the opposite end terminating blindly; thus their length corresponds with the thickness of the wall.

Genus 1. *Chonelasma*, n. g., p. 76.

Species i, *C. lamella*, n. sp.; ii, *C. hamatum*, n. sp.;
iii, *C. doederleinii*, n. sp.; iv, *C. calyx*, n. sp.

Fam. 4. *Tretodictyidæ*, F. E. S. With irregularly arranged ex- and in-current canals, which penetrate the body-wall, and particularly the more or less dense dictyonal skeleton, not transversely, but obliquely, or longitudinally, or in an undulating course.

Genus 1. *Tretodictyum*, n. g., p. 78.

Species i, *T. tubulosum*, n. sp.; ii, *T. latum*, n. sp.;
iii, *T. cyathus*, n. sp.

Genus 2. *Euryplegma*, n. g., p. 80.

Species i, *E. auriculare*, n. sp.

Genus 3. *Cyrtaulon* (*Volvulina*, O. Sdt.), p. 81.

Species i, *C. sigsbeeii*, O. Sdt.; ii, *C. solutus*, n. sp.

Genus 4. *Fieldingia*, Sav. Kent, p. 82.

Species i, *F. layettoides*, Sav. Kent.

Genus 5. *Sclerothamnus*, W. Marshall, p. 83.

Species i, *S. clausii*, Marshl.

Tribe 2. *Inermia*, F.E.S. Dictyonina without uncinates or scopulæ.

Fam. 1. *Meandrospongidæ*, Zittel. The body consists of a system of labyrinthine, anastomosing tubes of fairly uniform calibre, with a composite system of interspaces remaining between. Through the latter the water gains access to the interior, traverses the tube wall, and finds its way out either through the gastral cavity, or at once to the exterior.

Genus 1. *Dactylocalyx*, Stutchbury, p. 84.

Species i, *D. pumiceus*, Stutchb.; ii, *D. subglobosus*,
Gray; iii, *D. patella*, n. sp.

Genus 2. *Scleroplegma*, O. Sdt., p. 86.

Species i, *S. conicum*, O. Sdt.

Genus 3. *Margaritella*, O. Sdt., p. 86

Species i, *M. caloptychoides*, O. Sdt.

Genus 4. *Myliusia*, Gray, p. 87.

Species i, *M. callocyathus*, Gray.

Genus 5. *Aulocystis*, n. g., p. 87.

Species i, *A. grayi*, Bwk. sp.; ii, *A. zitteli*, Marshl. sp.

RIDLEY & DENDY (33) give the following classification of the Order *Monaxonida* in their Preliminary Report of the 'Challenger' Sponges:—

Order. **MONAXONIDA.** Siliceous Sponges with uni-axial skeleton-spicules.

Sub-order 1. **HALICHONDRINA**, Vosmaer. Non-corticate, skeleton reticulate, skeleton spicules acerates or acuate.

Fam. 1. *Homorhaphidæ*, R. & D. Skeleton spicules acerate to cylindrical; no flesh spicules.

Subfam. 1. *Renierinæ*. Spicules never completely enveloped in horny fibre.

Genus 1. *Halichondria* (Fleming), p. 326. *H. solida*, n. sp., *H. pelliculata*, n. sp., *H. latrun-culoides*, n. sp.

Genus 2. *Petrosia* (Vosmaer), p. 326. *P. similis*, n. sp., *P. truncata*, n. sp., *P. hispida*, n. sp.

Genus 3. *Reniera* (Nardo), p. 327. *R. subglobosa*, n. sp. *R. tufa*, n. sp.

Subfam. 2. *Chalininæ*. Spongin forming a thick sheath around the fibres.

Genus 1. *Pachychalina* (O. Sdt.), p. 328. *P. megalo-raphis*, n. sp., *P. elongata*, n. sp., *P. (?) punctata*, n. sp., *P. pedunculata*, n. sp.

Genus 2. *Dasychalina*, n. g., p. 329. *D. fragilis*, n. sp., *D. melior*, n. sp., *D. fibrosa*, n. sp.

Genus 3. *Chalina* (Grant), p. 330. *C. rectangularis*, n. sp.

Genus 4. *Siphonochalina* (O. Sdt.), p. 331. *S. inter-media*, n. sp., *S. annulata*.

Fam. 2. *Heterorhaphidæ*. Spicules of various forms; flesh spicules commonly present, but never anchorates.

Subfam. 1. *Phloeodictyina* (Carter). Sponge divisible into body and fistulæ, with a strong spicular rind. Skeleton spicules acerate to cylindrical.

Genus 1. *Rhizochalina* (O. Sdt.), p. 332. *R. putridosa* (Lamarck?).

Genus 2. *Oceanapia* (Norman), p. 332. *O. robusta* (Bwk.).

Subfam. 2. *Gelliinæ*. Skeleton spicules acerate. Flesh spicules present, viz., bihamates or tricurvates. No rind or fistulæ.

Genus 1. *Gellius* (Gray), p. 333. *G. carduus*, n. sp., *G. levis*, n. sp., *G. glacialis*, n. sp., *G. flagellifer*, n. sp., *G. calyx*, n. sp., *G. flabelliformis*, n. sp.

Genus 2. *Gelliodes* (Ridley), p. 334. *G. poculum*, n. sp.

Genus 3. *Toxochalina* (Ridley), p. 334. *T. robusta* (Ridley).

Subfam. 3. *Tedunia* (Gray). Spicules acuate and cylindrical (the latter chiefly dermal), and long hair-like trichites.

- Genus 1. *Tedania* (Gray), p. 335. *T. commixta*, n. sp.,
T. massa, n. sp., *T. infundibuliformis*, n. sp.,
T. actiniiformis, n. sp.
- Genus 2. *Trachytedania* (Ridley). *T. patagonica*, n. sp.
- Subfam. 4. *Desmacellina*. Skeleton spicules acuate to spinulate. Flesh spicules bihamates or tricurvates, or both.
- Genus 1. *Desmacella* (O. Sdt.), p. 336. *D. annexa* (O. Sdt.).
- Subfam. 5. *Vomerulina*. Characterized by a trenchant bihamate spicule.
- Genus 1. *Vomerula* (O. Sdt.), p. 337. *V. esperioides*, n. sp.
- Fam. 3. *Desmacidonidae*. Skeleton spicules of various forms. Anchorate flesh spicules normally present.
- Subfam. 1. *Esperina*. Fibre not echinated by laterally projecting spicules.
- Genus 1. *Esperella* (Vosmaer), p. 337. *E. mammiformis*, n. sp., *E. lapidiformis*, *E. murrayi*, n. sp., *E. porosa*, n. sp., *E. nuda*, n. sp., *E. fusca*, n. sp., *E. arenicola*, n. sp., *E. simonis*, n. sp., *E. biserialis*, n. sp.
- Genus 2. *Esperiopsis* (Carter), p. 340. *E. symmetrica*, n. sp., *E. cylindrica*, n. sp., *E. challengerii*, n. sp., *E. profunda*, n. sp., *E. anomala*, n. sp., *E. ? pulchella*, n. sp.
- Genus 3. *Cladorriza* (Sars), p. 342. *C. moruliformis*, n. sp., *C. longispina*, n. sp., *C. similis*, n. sp., *C. inversa*, n. sp., *C. tridentata*, n. sp.
- Genus 4. *Trochoderma*, n. g., p. 344. *T. mirabile*, n. sp.
- Genus 5. *Chondrocladia* (Wy.Th.), p. 344. *C. stipitata*, n. sp., *C. clavata*, n. sp., *C. crinita*, n. sp.
- Genus 6. *Desmacidon* (Bowerbank), p. 345. *D. reptans*, n. sp., *D. conulosa*, n. sp., *D. ? conulosa*, n. sp., *D. ? ramosa*, n. sp.
- Subgenus *Homodictya* (Ehlers), p. 346. *H. ker-gueliensis*, n. sp., *H. grandis*.
- Genus 7. *Artemisina* (Vosmaer), p. 347. *A. subcritoides* (Vos.).
- Genus 8. *Phelloderma*, n. g., p. 347. *P. radiatum*, n. sp.
- Genus 9. *Sideroderma*, n. g., p. 348. *S. navicelligerum* (Ridley).
- Genus 10. *Iophon* (Gray), p. 348. *I. chelifer*, n. sp., *I. cylindricus*, n. sp., *I. laminalis*, n. sp.
- Genus 11. *Amphilectus* (Vosmaer), p. 350. *A. apollinis*, n. sp., *A. ceratosus*, *A. pilosus*, n. sp., *A. annectans*, n. sp.
- Subfam. 2. *Ectyoninae*. Fibre normally echinated by laterally projecting spicules.

- Genus 1. *Myxilla* (O. Sdt.), p. 470. *M. digitata*, n. sp., *M. paucispinata*, n. sp., *M. mollis*, n. sp., *M. spongiosa*, n. sp., *M. hastata*, n. sp., *M. cribrigera*, n. sp., *M. fusca*, n. sp., *M. mariana*, n. sp., *M. compressa*, n. sp., *M. nobilis*, n. sp., *M. frondosa*, n. sp.
- Genus 2. *Clathria* (O. Sdt.), p. 474. *C. lendenfeldi*, n. sp., *C. elegantula*, n. sp., *C. ? inanchorata*, n. sp.
- Genus 3. *Raphidophlus* (Ehlers), p. 475. *R. filifer*, n. sp.
- Genus 4. *Plumohalichondria* (Carter), p. 475. *P. mamillata* (Crtr.).
- Genus 5. *Plocamia* (O. Sdt.), p. 475. *P. coriacea* (Bwk.).
- Genus 6. *Acarnus* (Gray), p. 476. *A. ternatus* (Ridley).
- Genus 7. *Echinoclathria* (Crtr.), p. 476. *E. carteri*, n. sp., *E. glabra*, n. sp.
- Genus 8. *Agelas* (Duch. & Mich.), p. 476. *A. mauritianus* (Crtr.).
- Genus 9. *Echinodictyum* (Ridley), p. 477. *E. rugosum*, n. sp., *E. asperum*, n. sp.
- Fam. 4. *Axinellidæ*. Skeleton typically non-reticulate, consisting of ascending axes of fibres from which arise subsidiary fibres radiating to the surface. Fibres typically plumose. Skeleton spicules chiefly acuate; acerates and cylindricals may also be present. Flesh spicules rarely present, never anchorates.
- Genus 1. *Hymeniacidon* (Bwk.), p. 477. *H. caruncula* (Bwk.), *H. subacerata*, n. sp.
- Genus 2. *Phakellia* (Bwk.), p. 478. *P. flabellata*, n. sp., *P. papyracea*, n. sp.
- Genus 3. *Ciocalyptra* (Bwk.), p. 478. *C. hyaloderma*, n. sp., *C. amorphosa*, n. sp.
- Genus 4. *Acanthella* (O. Sdt.), p. 479. *A. pulcherrima*, n. sp.
- Genus 5. *Axinella* (O. Sdt.), p. 479. *A. arborescens*, n. sp., *A. balfourensis*, n. sp., *A. mariana*, n. sp., *A. profunda*, n. sp., *A. fibrosa*, n. sp., *A. reticulata*, n. sp., *A. monticularis*, n. sp., *A. ? lunæcharta*, n. sp., *A. ? tubulosa*, n. sp., *A. ? paradoxa*, n. sp.
- Genus 6. *Raspalia* (Nardo), p. 482. *R. tenuis*, n. sp., *R. flagelliformis*, n. sp., *R. ? rigida*, n. sp.
- Genus 7. *Dendropsis*, n. g., p. 483. *D. bidentifera*, n. sp.
- Genus 8. *Thrinacophora* (Ridley), p. 483. *T. cervicornis*, n. sp., *T. funiformis*.
- Sub-order II. **CLAVULINA** (Vosmaer). Typically corticate; skeleton typically radiate; skeleton spicules almost always spinulate. Flesh spicules may be present, but never anchorates.
- Fam. 1. *Suberitidæ*. Without flesh spicules.

- Genus 1. *Suberites* (Nardo), p. 484. *S. caminatus*, n. sp., *S. senilis*, n. sp., *S. perfectus*, n. sp., *S. axiatus*, n. sp., *S. durissimus*, n. sp., *S. mollis*, n. sp., *S. elongata*, n. sp., *S. spiralis*, n. sp., *S. ramulosa*, n. sp.
- Genus 2. *Polymastia* (Bwk.), p. 487. *P. corticata*, n. sp., *P. agglutinans*, n. sp.
- Genus 3. *Proteleia* (Dend. & Rid.), p. 488. *P. sollasi*.
- Genus 4. *Trichostemma* (M. Sars), p. 488. *T. sarsii*, n. sp., *T. irregularis*, n. sp.
- Genus 5. *Tentorium* (Vosmaer), p. 489. *T. semisuberites* (O. Sdt.).
- Genus 6. *Stylocordyla* (Wy. Th.), p. 489. *S. stipitata* (Crtr.).
- Genus 7. *Quasillina* (Norman), p. 489. *Q. brevis* (Bwk.).
- Genus 8. *Cliona* (Grant), p. 490. *C. dissimilis*, n. sp.
- Fam. 2. *Spirastrellidae*. With special flesh spicules, which chiefly form a dermal crust.
- Genus 1. *Spirastrella* (O. Sdt.), p. 490. *S. massa*, n. sp., *S. solida*, n. sp., *S. papillosa*, n. sp.
- Genus 2. *Latrunculia* (Bocage), p. 491. *L. apicalis*, n. sp., *L. brevis*, n. sp., *L. bocagei*, n. sp., *L. ? acerata*, n. sp.

SOLLAS (36) proposes the following provisional classification of the *Tetractinellida*, based on a study of the material obtained by the 'Challenger':—

Tribe 1. TETRACTINELLIDA, Marshall. Skeleton characterized by quadri-radiate spicules, or "Lithistid" sclerites.

Order I. CHORISTIDA, Sollas. Quadri-radiate spicules are present, but not "Lithistid" sclerites.

Order II. LITHISTIDA, Zittel. The chief skeleton consists of "Lithistid" sclerites, articulated to form a consistent network. Quadri-radiate spicules may be present or not.

Suborder I. TETRADINA. The chief spicules of the choanosome are tetrads, amphitetrads, candelabra, or modified triæna.

Fam. 1. *Plakinidae*, Schulze. The canal system is eury-pylous. Candelabra are present.

Genus 1. *Epallax*, n. g.

Fam. 2. *Pachastrellidae*. The canal system is either eury-pylous or aphodal. The tetrads are simple.

Fam. 3. *Corticidae*, Vosmaer. The canal-system is aphodal. The characteristic tetrads are candelabra, or forks with trifurcate arms, or forks with the surface ornamented with spines, or amphitetrads.

Genus 1. *Thrombus*, n. g.

Suborder II. TRIANINA. The heads of the adult triænes are confined to the ectosome.

Fam. 1. *Tetillidæ*. Flesh-spicules are arculi or sprulæ ; the triæna are characteristic ; the canal system in the lower forms is eurypylous, in the higher aphodal ; the ectosome in the lower forms is the outer epithelium and a thin layer of collenchyma, in the higher, a highly differentiated cortex : the choanosome, a collenchymatous mesoderm in the lower forms, sarcenchymatous in the higher.

Genus 1, *Tetilla*, O. Sdt. Genus 2, *Chrotella*, n. g.
Genus 3, *Cinachyra*, n. g. Genus 4, *Craniella*, O. Sdt.

Fam. 2. *Theneidæ*. The flesh spicule is a spinispirula, stellates are absent, the canal system is eurypylous, the ectosome is not differentiated to form a cortex, the mesoderm of the choanosome is collenchymatous.

Genus 1, *Thenea*, Gray. Genus 2, *Normania*, Bwk.
Genus 3, *Vulcanella*, n. g. Genus 4, *Characella*, n. g.

Fam. 3. *Stellettinidæ*. The characteristic flesh spicule is a stellate, other forms may also be present ; the canal system is aphodal, but approaches the eurypylous in the lower forms ; the ectosome may or may not form a cortex ; the mesoderm of the choanosome is a sarcenchyme.

Subfam. 1. *Homasterina*. Stellettidæ with but one form of stellate.

Genus 1, *Myriastræ*, n. g. Genus 2, *Pilochrota*, n. g.
Genus 3, *Asterella*, n. g.

The remaining divisions of the family possess more than one form of stellate.

Subfam. 2. *Stellettina*. Two forms of stellate are present.

Genus 4, *Anthrastra*, n. g. Genus 5, *Stelletta*, O. Sdt.
Genus 6, *Dragmastra*, n. g.

Subfam. 3. *Sanidasterina*. One form is a stellate, the other a sanidaster.

Genus 7, *Tribrachium*, Weltner. Genus 8, *Tethyopsis*, Stewart.

Subfam. 4. *Stryphnina*. One form is a stellate, the other an amphiastrella.

Genus 1-9. *Stryphnus*, n. g.

Subfam. 5. *Psammasterina*. One form is a stellate, the other a spined bacillus.

Genus 10, *Psammastra*, n. g.

Fam. 4. *Geodinidae*. The characteristic spicule is the globate, the canal system is always aphodal, the cortex always well differentiated, the mesoderm of the choanosome a sarcenchyme.

Genus 1, *Erylus*, Gray. Genus 2, *Caminus*, O. Sdt.
Genus 3, *Cydonium*, Müller. Genus 4,
Synpos, Vosmaer. Genus 5, *Isops*, Sollas.
Genus 6, *Geodia*, Lamark.

VEJDOVSKY (39) gives the following classification of the freshwater Sponges of Europe :—

Fam. SPONGILLIDÆ.

Subfam. *Spongilline*, Carter.

Genus. *Spongilla*.

Subgenus. *Euspongilla*, Vejd. (1) *E. lacustris*, auct.,
(2) *E. rhenana*, Retzer.

Subgenus. *Spongilla*. (3) *S. fragilis*, Leidy.

Subfam. *Meyenine*, Carter.

Genus. *Trochospongilla*, Vejd. (4) *T. erinaceus*, Ehrbg.

Genus. *Ephydatia*, Gray, nec Lamk. (5) *E. mülleri*, Lieberkuhn. (6) *E. fluviatilis*, auct. (7) *E. bohemica*, F. Petr.

Genus. *Carterius*, Potts. (8) *C. stepanovii*, Petr. (Dyb.).

VOSMAER (41) gives a revision of the classification of the *Calcarea*, pp. 369–390.

DISTRIBUTION.

VOSMAER (41) gives a general account of the distribution of Sponges.

Jan Mayen. MARENZELLER (23): *Cribrochalina ambigua*, n. sp., 230 mètres, pl. i, fig. 1, p. 1; *Desmacidon incrustans*, Jnstn., strand S. side the Island, p. 1; *Esperia constricta*, Bwk., 90–400 mètres, p. 2; *Suberites lutkeni*, O. Sdt., on the shore and 30 mètres, p. 3, *S. crelloides*, n. sp., 230 mètres, pl. i, fig. 3, p. 4; *Tetilla geniculata*, n. sp., 350–400 mètres, pl. i, fig. 4, p. 5; *Thenea wallichii*, P. Wright, 350–400 mètres, p. 6; *Sycandra utriculus*, O. Sdt., 20–260 mètres, p. 6, *S. arctica*, H., 20–270 mètres, p. 6.

KOEHLER (16) describes the following from the Channel Is. (Note.—J. = Jersey, G. = Guernsey, H. = Herm., S. = Sark.) *Sycon ciliatum*, H. (J. G. H. S.), *S. tessellatus*, Bwk. (G. H. S.); *Grantia compressa*, Flem. (J. G. H. S.), *G. ensata*, Bwk. (G.); *Leuconia nivea*, Gr. (J. S.); *Leucosolenia contorta*, Bwk. (S.), *L. botrylloides*, Bwk. (J. G. H.), *L. lacunosa*, Bwk. (G.); *Leucogypsia gossei*, Bwk. (S.); *Geodia zelandica*, Jnstn. (S.); *Caminus osculosus*, Grube (J. S.); *Polymastia mammillaris*, Bwk. (G.); *Tethya lyncurium*, Jnstn. (J. S.), *T. collingsii*, Bwk. (S.); *Dictyocylindrus ramosus*, Bwk. (J. G.); *Microciona armata*, Bwk. (J. G.), *M. atrosanguinea*, Bwk. (S.); *Hymeniacion caruncula*, Bwk. (J. G. H.), *H. mammeata*, Bwk. (J. G.); *H. celata*, Bwk. (J. G.); *Halichondria*

panicea, Jnstn. (J. G. H. S.), *H. incrustans*, Jnstn. (G. H.); *Isodictya cinerea*, Bwk. (J. G.), *H. densa*, Bwk. (G.), *H. simulans*, Bwk. (J. G. H. S.), *H. fucorum*, Bwk. (J. G. H.), *H. infundibuliformis*, Bwk. (G.); *Chalina cervicornis*, Bwk. (G.); *Dysidea* (?) *fragilis*, Jnstn. (J.); *Verongia rosea* (?), Barrois; *Raphyrus griffithsii*, Bwk. (G.); *Ophalitospongia papillata*, Bwk. (G.).

Mediterranean (Minorca). LAKSCHEWITZ (17) describes: *Ascetta primordialis*, H., *A. clathrus*, H., *A. blanca*, H., *A. canariensis*, H., *A. minoricensis*, n. sp.; *Leuconia pumila*, H., *L. aspera*, H., *L. balearica*, n. sp.; *L. rodriguezii*, n. sp.; *Sycandra carinata*, H., *S. raphanus*, H., *S. setosa*, H., *S. schmidtii*, H., *S. elegans*, H., *S. humboldtii*, H. These are from Mahon and Alcaufa.

Newfoundland. POTTS (30) describes: *Spongilla lacustris*, auct., C., *S. fragilis*, Leidy., *S. mackayi*, Crtr.; *Meyenia fluviatilis*, auct.; *Heteromeyenia pictonvensis*; *Tubella pensylvanica*, Potts; and *S. novæ-terreæ*, n. sp.

North Atlantic. RIDLEY & DENDY (33) describe the following Monaxonida: *Desmacella annexa*, W. Indies, 390 fath.; *Artemisina suberitoides*, n. sp., *Tentorium semisuberites*, O. Sdt., *Stylocordyla stipitata*, Crtr., *Quasillina brevis*, Bwk., off Nova Scotia, 85 fath.; *Tentorium semisuberites*, O. Sdt., off Nova Scotia, 1250 fath.; *Trichostemma sarsii*, n. sp., W. of the Azores, 1000 fath.; *Plocamia coriacea* n. var. *elegans*, *Suberites elongatus*, n. sp., *Polymastia agglutinans*, n. sp., off the Azores, 450 fath.; *Reniera tufa*, n. sp., *Hymeniadon caruncula*, Bwk., *Axinella monticularis*, n. sp., *Axinella* (?) *lunæcharta*, n. sp., Cape Verde Is. SOLLAS describes the following Choristid Tetractinellida: *Thenia schmidtii*, n. sp., off the Straits of Gibraltar, 600 fath.; *Craniella schmidtii*, n. sp., off Culebra Is., W. Indies, 390 fath.; *Isops pachyderma*, n. sp., off Bermuda, 1075 fath.; *Pilochrota tenuispicula*, Bermuda; *Thenia schmidtii*, W. of the Azores, 1000 fath.; *Tetilla sandalina*, n. sp., Azores, 1000 fath.; *Thenia fenestrata*, O. Sdt., E. of St. Paul's I., 1850 fath.; *Pilochrota gigas*, St. Paul's Rocks; *Normania crassiuscula*, n. sp., *Vulcanella cribrifera*, n. sp., Cape Verde Is., 100-128 fath.

South Atlantic. RIDLEY & DENDY (33): (Monaxonida) *Polymastia corticata*, n. sp., between Pernambuco and Bahia, 1200 fath.; (?) *Oceanapia robusta*, Bwk., *Esperella nuda*, n. sp., *E. fusca*, n. sp., *Desmacidon reptans*, n. sp., *Axinella reticulata*, n. sp., *Raspalia tenuis*, n. sp., *Thrinacophora funiformis*, n. sp., *Stylocordyla stipitata*, Crtr., off Bahia; *Axinella* (?) *paradoxa*, n. sp., *Tentorium semisuberites*, Sdt., Inaccessible I., Tristan da Cunha; *Agelas mauritanus*, Crtr., *Latrunculia* (?) *acerata*, n. sp., off Tristan da Cunha (?); *Esperella simonis*, n. sp., *Desmacidon conulosa*, n. sp., *Homeodictya grandis*, n. sp., *Raspalia flagelliformis*, n. sp., *Dendropsis bidentifera*, n. sp., *Proteleia sollasi*, n. sp., R. & D., Simon's Bay, C. of Good Hope; *Petrosia similis*, n. sp., *Gellius glacialis*, n. sp., *Vomerula esperioides*, n. sp., *Desmacidon ramosa*, n. sp., *Iophon chelifer*, n. sp., *Myxilla digitata*, n. sp., *Raspalia* (?) *rigida*, n. sp., S. of C. of Good Hope, 150 fath.; *Tedania massa*, n. sp., *Axinella fibrosa*, n. sp., E. of Straits of Magellan, 55 fath.; *Petrosia similis*, n. sp., *massa*, n. var., between Straits of Magellan and Falkland I., 70 fath.; *Halichondria latrunculoidea*, n. sp.,

Gellius levis, n. sp., *G. calyx*, n. sp., *G. flabelliformis*, n. sp., *Tedania massa*, n. sp., *Vomerula esperioides*, n. sp., *Esperella lapidiformis*, n. sp., *Phelloderma radiatum*, n. sp., *Amphilectus annectans*, n. sp., *Myxilla spongiosa*, n. sp., *M. hastata*, n. sp., *M. compressa*, n. sp., *M. nobilis*, n. sp., *Ciocalyptha hyaloderma*, n. sp., *C. amorphosa*, n. sp., *Axinella* (?) *tubulosa*, n. sp., *Suberites caminatus*, n. sp., *S. axiatus*, n. sp., *Latrunculia apicalis*, n. sp., *L. brevis*, n. sp., off the mouth of the Rio de la Plata, 600 fath.; *Cladoriza inversa*, n. sp., lat. 37° 29' S., long. 27° 31' W., 2200 fath. SOLLAS: (Tetractinellida) *Characella aspera*, n. sp., off Brazil, 350 fath.; *Synops neptuni*, n. sp., off Barre Grande, Brazil, 32 fath.; *S. vosmaeri*, n. sp., off Barre Grande, Brazil, 400 fath.; *Thenea fenestrata*, O. Sdt., off Macio, Brazil, 1715 fath.; *Craniella carteri*, n. sp., *Pilochrota crassispicula*, n. sp., *P. anancora*, n. sp., *Tribrachium schmidtii*, Weltner, *Erylus formosus*, n. sp., *Caminus sphericonia*, n. sp., *Cydonium glariosus*, n. sp., off Bahia; *Tetilla leptoderma*, n. sp., between Falkland I. and Rio de la Plate.

South Indian Ocean. RIDLEY & DENDY (33): (Monaxonida) *Gellius carduus*, n. sp., *G. flagellifer*, n. sp., *Desmacidon* (?) *ramosu*, n. sp., *Iophon abnormalis*, n. sp., *Amphilectus pilosus*, n. sp., *Myxilla mariana*, n. sp., *Axinella mariana*, n. sp., *Suberites caminatus*, n. sp., off Marion I., 50-75 fath.; *Gellius carduus*, n. sp., off Prince Edward I.; *Gellius glacialis* var. *nivea*, n. sp. & var., *Stylocordyla stipitata* n. var. *globosa*, off Prince Edward I., 140 fath.; *Esperiopsis symmetrica*, n. sp., *Iophon chelifer*, n. sp., *I. laminalis*, n. sp., *Phakellia papyracea*, n. sp., off Prince Edward I., 310 fath.; *Esperella mammiformis*, n. sp., *Esperiopsis profunda*, n. sp., *Cladoriza tridentata*, n. sp., *Meliiderma stipitata*, n. sp., *Stylocordyla stipitata*, Crtr., between Prince Edward I. and Crozet I., 1600 fath.; *Phakellia papyracea*, n. sp., *Suberites mollis*, n. sp., Possession I., 210 fath.; *Gellius carduus*, n. sp., *Iophon chelifer*, n. sp., *Myxilla nobilis*, n. sp., S. of Crozet I., 240-550 fath.; *Petrosia hispida*, n. sp., *Pachychalina* (?) *pedunculata*, n. sp., *Homæodictya kerguelensis*, n. sp., *Amphilectus apollinis*, n. sp., *A. pilosus*, n. sp., *Axinella balfourensis*, n. sp., *Stylocordyla stipitata* n. var. *globosa*, *Latrunculia apicalis*, n. sp., *L. bocagii*, Kerguelen; *Petrosia similis*, n. sp., *Myxilla fusca*, n. sp., W. of Heard I., 150 fath.; *Cladoriza moruliformis*, n. sp., lat. 53° 55' S., long. 108° 35' E., 1950 fath. SOLLAS: (Tetractinellida) *Thenea delicata*, n. sp., between Prince Edward I. and Crozet I., 1600 fath.; *Tetilla grandis*, n. sp., *Cinachyra barbata*, n. sp., Kerguelen, 25 fath.; *C. barbata*, 60 fath.; *Tetilla grandis*, Kerguelen, 10-100 fath.; *Tetilla grandis* var. *alba*, Christmas I., 120 fath.; *Tetilla grandis* var. *alba*, *Normania schulzii*, n. sp., W. of Heard I., 150 fath.

PACIFIC OCEAN.

S.E. Australia. CARTER (1 & 2): (Calcarea) *Clathrina cavata*, n. sp., p. 502, *C. osculum*, n. sp., pp. 1 & 503, *C. tripodifera*, n. sp., p. 505, and n. var. *gravida*, p. 507, *C. laminoclathrata*, n. sp., p. 509, *C. primordialis*, n. sp., p. 510, *C. ventricosa*, n. sp., p. 512, *C. latitubulosa*, n. sp., p. 515; *Sycandra ramsayi* var., Ldf., p. 35; *Grantia subhispida*, n. sp., p. 36, *G. compressa*, auct., *G. compressa* n. var. *fistulata*, p. 37; *Syconthalmus alcyon-*

cellum, H., p. 38; *Teichonella labyrinthica*, Crtr., p. 38; *Hypograntia infrequens*, n. g. & sp., p. 39, *H. hirsuta*, n. sp., p. 41, *H. sacca* var., Ldf., p. 42, *H. extusarticulata*, n. sp., p. 43, *H. intusarticulata*, n. sp., p. 45, *H. mediusarticulata*, n. sp., p. 46; *Heteropia polyperistomia*, n. g. & sp., p. 47, *H. patulosulifera*, n. sp., p. 59, *H. macera*, n. sp., p. 50, *H. compressa*, n. sp., p. 51, *H. pluriosculifera*, n. sp., p. 52, *H. erecta*, n. sp., p. 53, *H. spissa*, n. sp., p. 54; *Leuconia fistulosa* n. var. *australiensis*, p. 127, *L. hispida*, n. sp., p. 128, *L. echinata*, n. sp., p. 129, *L. erinaceus*, n. sp., p. 130, *L. nivea* n. var. *australiensis*, p. 131, *L. johnstoni* n. var. *australiensis*, p. 133; *Aphroceras asconides*, n. sp., p. 134, *A. syconides*, n. sp., p. 135; *Lelapia australis*, Gray, pp. 138 & 148; *Leuconia multifida*, n. sp., p. 141, *L. lobata*, n. sp., p. 143, *L. compacta*, n. sp., p. 144; *Leucaltis floridana*, H., n. var. *australiensis*, p. 145; *Teichonella prolifera*, Crtr., p. 146.

(Myxospongia) *Halisarca australiensis*, n. sp., p. 273, *H. ascidiarum*, n. sp., p. 273, *H. reticulata*, n. sp., p. 274, *H. tessellata*, n. sp., p. 275, *H. australiensis* n. var. *arenacea*, p. 277; *Chondrilla nucula*, O. Sdt., p. 277, *C. secunda*, v. Ldf., p. 277, *C. papillata*, v. Ldf., p. 278.

(Ceratosa) *Dendrilla rosea*, v. Ldf., var. *digitata*, Crtr., p. 281; *Aplysina cespitosa*, n. sp., p. 282, *A. massa*, n. sp., p. 284, *A. nævus*, n. sp., p. 285, *A. cruor*, n. sp., p. 286; *Pseudoceratina typica*, n. sp., p. 287; *Stelospongos cribrocrusta*, n. sp., p. 371; *Hircinia flagelliformis*, n. sp., p. 372, *H. rectilinea*, Hyatt, p. 373; *Euspongia infundibuliformis*, n. sp., p. 374.

(Monaxonida) *Chalina oculata* n. var. *repens*, p. 375; *Acervochalina claviformis*, n. sp., p. 376.

Amorphosa anonyma, n. sp., p. 49, *A. nigrocutis*, n. sp., p. 50, *A. cancellosa*, n. sp., p. 50; *Thalysias massalis*, n. sp., p. 50; *Reniera vasiformis*, n. sp., p. 46; *Fibulia carnosa*, n. g. & sp. (provisional), p. 51; *Halichondria birotula*, Higgin, p. 52, *H. isodictyalis*, Crtr., p. 52; *Tedania digitata*, Gray, p. 52, *T. digitata* n. var. *verrucosa*, p. 53; *Forcepia colonensis*, Crtr.; *Phloeodictyon cohaerens*, n. sp., p. 446, *P. birotuliferum*, n. sp., p. 447, pl. x, figs. 1-5; *Halichondria scabida*, Crtr., p. 449, *H. pustulosa*, n. sp., p. 450, *H. compressa*, n. sp., p. 450, *H. stelliderma*, n. sp., p. 451; *Histioderma verrucosum*, n. sp., p. 452, *H. polymasteides*, n. sp., p. 453; *Pseudohalichondria clavilobata*, n. g. & sp., p. 454, pl. x, figs. 6-9; *Pseudoesperia enigmatica*, n. n., = *Esperia parasitica*, p. 455; *Plumohalichondria plumosa* n. var. *purpurea*, p. 376; *Axinella chalinoides*, n. var. *cribosa*, p. 377, *A. cladoflagellata*, n. sp., p. 377, *A. coccinea*, n. sp., p. 378; *Phakellia ventilabrum*, n. var. *australiensis*, p. 379, *P. papyracea*, n. sp., p. 379, *P. villosa*, n. sp., p. 379.

Suberites wilsoni, Crtr., p. 116, and n. var. *albidus*, p. 116, *S. globosa*, n. sp., p. 116, *S. flabellatus*, n. sp., p. 117, *S. biceps*, n. sp., p. 117, *S. insignis*, n. sp., p. 118, *S. parasitica*, n. sp., p. 119; *Polymastia bicolor*, n. sp., p. 119, and n. var. *glomerata*, p. 119, and n. var. *crassa*, p. 120, *P. massalis*, n. sp., p. 121, *Trachya globosa*, n. sp., p. 121, *Tethya cliftoni*, Bk., p. 122, *Chondropsis arenifera*, n. sp., p. 122; *Trachya globosa*, n. var. *rugosa*, p. 457, *T. horrida*, n. sp., p. 457; *Cliona celata*, Grant, p. 458; *Vioa johnstonii*, O. Sdt., p. 458; *Spirastrella cunctatrix*, O. Sdt., p. 113, and n. var. *robusta*, p. 114, and n. var. *porcata*, p. 115.

(Tetractinellida) *Stelletta bacillifera* var. *robusta*, Crtr., p. 123, *S.*

aeruginosa, n. sp., p. 123, *S. mamilliformis*, n. sp., p. 124, *S. geodides*, n. sp., p. 125, *Stellettinopsis tuberculata*, n. sp., p. 126, *S. coriacea*, n. sp., p. 126; *Tethya* (*Craniella*) *cranium*, n. var. *australiensis*, p. 127; *Stelletta ochracea*, n. sp., p. 458, *Stellettinopsis lutea*, n. sp., p. 459, *S. purpurea*, n. sp., p. 459; *Tethya* (*Tetilla*) *stipitata*, n. sp.; p. 460.

South-east Coast of Australia. RIDLEY & DENDY (33): (Monaxonida) *Pachychalina elongata*, n. sp., *P.* (?) *punctata*, n. sp., *Siphonochalina annulata*, n. sp., *Rhizochalina putridosa*, Lmk. (?), *Tedania commixta*, n. sp., *Esperella arenicola*, n. sp., *Clathria elegantula*, n. sp., *Plumohalichondria mammillata*, Crtr., *Echinoclathria carteri*, n. sp., *E. glabra*, n. sp., Bass Strait, 38 fath.; *Iophon cylindricus*, n. sp., *Clathria* (?) *inancorata*, n. sp., *Echinoclathria carteri*, n. sp., 150 fath.; *Siphonochalina intermedia*, n. sp., *Rhizochalina putridosa*, Lmk., *Gelliodes poculum*, n. sp., *Esperella murrayi*, n. sp., *E. porosa*, n. sp., *Esperiopsis cylindrica*, n. sp., *Amphilectus ceratosus*, n. sp., *Clathria lendenfeldi*, n. sp., *Echinoclathria carteri*, n. sp., *Phakellia flabellata*, n. sp., *Azinella arborescens*, n. sp., *Suberites perfectus*, n. sp., *Spirastrella papillosa*, n. sp., off Port Jackson; *Pachychalina megaloraphis*, n. sp., *Tedania massa* (?), n. sp., 120 fath. LENDENFELD: (Ceratos) *Halme laxa*, n. sp., 30 mètres, n. var. *digitata*, p. 847; *H. gigantea*, n. sp., n. var. *micropora*, *intermedia*, n. var. *macropora*, *H. tingens*, Thursday I.; *Chalinopsis imitans*, n. sp., *Dendrilla cavernosa*, n. sp. (Monaxodina) *Dactyochalina cylindrica*, n. sp., *D. reticulata*, n. sp., *D. australis*, n. sp., *Raphyrus hizonii*, n. sp., 40 mètres.

SOLLAS (36): (Tetractinellida) *Anthastra parvispicula*, n. sp., 33 fath.; *Anthastra communis*, n. sp., *Pilochrota lendenfeldi*, n. sp., *Psammastra murrayi*, n. sp., Bass Strait, 38 fath.; *Chrotella simplex*, n. sp., *Craniella pulchra*, n. sp., *Anthastra pulchra*, n. sp., *A. communis*, n. sp., 150 fath.; *Thenea grayi*, n. sp., 400 fath.; *Anthastra communis*, n. sp., Port Jackson; *Cydonium eosaster*, n. sp., Port Jackson, 6-15 fath.; *Anthastra pyriformis*, n. sp., *A. ridleyi*, n. sp., *Stryphnus niger*, n. sp., *Synops nitida*, n. sp., Port Jackson, 30-35 fath.

West Coast of Australia. LENDENFELD (19): (Ceratos) *Chalinopsis*, n. gen., *dichotoma*, n. sp.; (Monaxona) *Dactylochalina australis*, n. sp.

North Coast of Australia. RIDLEY & DENDY (33): (Monaxonida) *Trichostemma sarsii*, n. sp., S.E. of Cape York, 1400 fath.; *Acanthella pulcherrima*, n. sp., Torres Straits, 3-11 fath.; *Sideroderma navicelligerum*, n. sp., *Cliona dissimilis*, n. sp., W. of Torres Strait, 28 fath. SOLLAS (36): (Tetractinellida) *Pilochrota purpurea*, n. var. *longancora*, *P. moseleyi*, n. sp., Torres Strait, 3-11 fath.; *Craniella bowerbankii*, n. sp., *Myriastrea simplicifurca*, n. sp., *M. clavosa*, Ridley, off Cape York, 8 fath.

East Indies. RIDLEY & DENDY (33): (Monaxonida) *Echinodictyum rugosum*, n. sp., S.W. of New Guinea, 49 fath.; *Esperiopsis pulchella*, n. sp., *Myxilla paucispinata*, n. sp., off Little Ki Is., 140 fath.; *Halichondria pelliculata*, n. sp., Amboina; *Esperiopsis challengerii*, n. sp., E. of Celebes Is., 825 fath.

Philippine Islands. *Suberites ramulosus*, n. sp., 700 fath.; *Petrosia similis*, n. var. *compacta*, *P. truncata*, n. sp., *Chalina rectangularis*, n. sp., *Raphidophlus filifer*, n. sp., *Hymeniacidon* (?) *subacerata*, n. sp., *Thrina-*

cophora cervicornis, n. sp., *Spirastrella solida*, n. sp., 18 fath. ; *Suberites ramulosus*, n. sp., n. var. *cylindrifera*, 95 fath. ; *Esperiopsis challengerii*, n. sp., n. var. *meangensis*, E. of Meangis Is., S. of Philippine Is., 500 fath. ; *Chondrocladia crinita*, n. sp., N. of New Guinea, 2000 fath. SOLLAS (36): (Tetractinellida) *Cydonium hirsutus*, n. sp., off the Ki Is., 129 fath. ; *Tetilla pedifera*, n. sp., between Amboina and Samboangan, 825 fath. ; *Normania laminaris*, n. sp., Amboina, 1000 fath. ; *Pilochrota hæckeli*, n. sp., Samboangan, 10 fath. ; *Myriastra toxodonta*, n. sp., Philippine Is., 20 fath. ; *Chrotella macellata*, n. sp., *Myriastra clavosa*, Ridley, Philippine Is., 18 fath. ; *Thenea wyvilli*, n. sp., Philippine Is., 95 fath. ; *Myriastra clavosa* n. var. *quadrata*, Philippine Is., 10 fath.

NORTH PACIFIC OCEAN.

RIDLEY & DENDY (33): (Monaxonida) *Axinella profunda*, n. sp., 2300 fath., lat. 35° 41' N., long. 157° 42' E. ; *Suberites senilis*, n. sp., lat. 36° 10' N., long. 178° 0' E., 2050 fath. ; *Chondrocladia concrescens* (?), lat. 37° 41' N., long. 177° 4' W., 2900 fath. ; *Esperiopsis anomala*, n. sp., Honolulu, *Cladoriza longipinna*, lat. 14° 19' N., long. 152° 37' W., 3000 fath. ; *Halichondria solida*, n. sp., *Acarus ternatus*, Ridley, *Echinodictyum asperum*, n. sp., Tahiti.

SOLLAS (36): (Tetractinellida) *Myriastra subtilis*, n. sp., Kobié, Japan, 8-50 fath. ; *Normania tenuilaminaris*, Japan, 238-775 fath. ; *Pilochrota pachydermata*, n. sp., Tahiti, 30-70 fath.

SOUTH PACIFIC OCEAN.

RIDLEY & DENDY (33): (Monaxonida) *Esperia biseriatis*, n. sp., *Cladoriza similis*, n. sp., *Axinella profunda*, n. sp., lat. 22° 21' S., long. 150° 17' W. ; *Esperia biseriatis*, n. sp., *Axoniderma mirabile*, n. sp., lat. 39° 13' S., long. 118° 49' W., 2250 fath. ; *Tedania actiniformis*, n. sp., *Trichostemma irregularis*, n. sp., lat. 33° 31' S., long. 74° 43' W. ; *Myxilla cribrigera*, n. sp., off the S.W. coast of Patagonia, 345 fath. ; *Reniera subglobosa*, n. sp., n. var. *bacullifera*, S.W. coast of Patagonia, 140 fath. ; *Trachytodania patagonia*, n. sp., 175 fath. ; *Gellius carduus*, n. sp., n. var. *magellanica*, *Myxilla nobilis*, n. sp., n. var. *patagonia*, S.W. coast of Patagonia, 245 fath. ; *Tedania infundibuliformis*, n. sp., *Tachytodania patagonia*, n. sp., *Myxilla mollis*, n. sp., *M. mariana*, n. var. *massa*, *Hymeniacidon* (?) *hyalina*, n., *Suberites spiralis*, n. sp., S.W. coast of Patagonia.

SOLLAS (36): (Tetractinellida) *Thenea wrightii*, n. sp., lat. 42° 43' S., long. 82° 11' W., 1450 fath. ; *Astellia vosmæri*, n. sp., *Stelletta phrissens*, n. sp., *Cydonium magellani*, n. sp., off Tom Bay, Patagonia, 175 fath., and Port Churruca, Patagonia.

NEW SPECIES.

MEGAMASTICTORA (CALCAREA).

For new species in this group, refer to CARTER, Distribution, S.E. Australia, and LAKSCHEWITZ (17), Mediterranean.

MICROMASTICORA.

I.—MYXOSPONGIÆ.

For new species, refer to CARTER (1, 2), Distribution, S.E. Australia.

II.—HEXACTINELLIDA.

For new species in this group, refer to SCHULZE (34), under Classification.

III.—DEMOSPONGIÆ.

A.—MONAXONIDA.

For new species, refer to RIDLEY & DENDY (33), under Classification ; CARTER (1, 2), under S.E. Australia, Distribution. In addition, MARENZELLER (23) describes *Cribrochalina ambigua*, *Suberites crelloides* ; and POTTS (30) *Spongilla novæ-terreæ*. NOLL (25) describes as a new species, *Spongilla glomerata*, from the island of Rügen, in the Herthasee ; of this, VEJDovsky (38) remarks that it is identical with *Spongilla fragilis*, Leidy.

VEJDovsky (39) : *Spongilla fragilis*, Leidy, = *S. lordii*, Bwk. ; *Spongilla contecta*, No. 11, = *S. siberica*, Dyb., = *S. glomerata*, Noll.

LENDENFELD (20), *Dactyochalina australis* ; (19), *D. cylindrica*, *D. reticulata*, *D. australis*, *Raphyrus hixonii*.

B.—CERATOSA.

For new species of this group, see CARTER (1, 2), under Distribution, S.E. Australia. LENDENFELD (19, 21) describes *Chalinopsis dichotoma*, *Halme laxa* var. *digitata*, *H. gigantea*, and vars. *micropora*, *intermedia*, *macropora*, *H. tingens*, *Dendrilla cavernosa*.

C.—TETRACTINELLIDA.

For new species, see SOLLAS (36), under Distribution. MARENZELLER (23) also describes *Tetilla geniculata*, n. sp. ; and LAMPE (8) *T. japonica*.

PROTOZOA.

BY

J. ARTHUR THOMSON, M.A., F.R.S.E.

Lecturer on Zoology in the School of Medicine, Edinburgh.

I.—LIST OF PUBLICATIONS.

*ASPER, G. Les Organismes microscopiques des lacs Suisses. Arch. Sci. nat. xvi (1886), pp. 366 & 367.

Most abundant pelagic forms are *Ceratium*, *Dinobryon*, *Volvox*, *Vorticella*, *Anurea*, *Polyarthra*, *Synchaeta*. Pelagic *Diffugia* also.

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*BALBIANI, E. Evolution des micro-organismes animaux et végétaux. J. Microgr. x, pp. 535–544.

BERGH, R. S. Ueber den Theilungsvorgang bei den Dinoflagellaten. Zool. JB. i, pp. 73–86.

BERTHOLD, G. Studien über Protoplasma-mechanik. Leipzig: Felix, 8vo, 332 pp., 7 pls; J. R. Micr. Soc. 1887, pp. 420–423.

Inter alia—Notes on morphology and physiology of some *Protozoa*.

BLANC, H. Sur un nouveau Foraminifère de la faune profonde du Lac Léman. Arch. Sci. nat. xvi, pp. 362–366.

Gromia brunneri, new, large, lemon-coloured shell of fine cemented particles.

BLOCHMANN, F. Die mikroskopische Pflanzen- und Thierwelt des Süßwassers (Kirchner, Blochmann, and Bütschli). Th. II. Die Thierwelt (Blochmann). Braunschweig: 4to, 119 pp., 7 pls.

—, Ueber eine neue *Hæmatococcus* Art. Verh. Ver. Heidelb. iii, 1886, pp. 441 & 442, 2 pls.

Hæmatococcus bütschli, n. sp.: swarming stage, with two anterior-lateral tubules for flagella; semilunar stigma; two or three contractile vacuoles; green colour.

BRAUN, M. Ueber eine neue Gattung parasitischer Infusorien. Centralbt. Bacteriol. ; J. R. Micr. Soc. 1887, p. 419.

BRADY, H. B. Note on *Orbitolites italica*, Costa sp. Ann. N. H. xviii, pp. 191 & 192.

Above species from Upper Miocene, near Messina, = Carpenter's *Orbitolites tenuissima* ; still living in Mediterranean.

BRANDT, K. Die Sphærozoen. Fauna und Flora des Golfes v. Neapel, 276 pp., 8 pls. (Dec., 1885). Summary : J. R. Micr. Soc. 1887, pp. 102-105.

Morphology, biology, development, and systematic of colonial Radiolarians; 4 n. sp. ; 1 n. g., *Myxosphæra*.

*BRASS, A. Bemerkungen zu meinen Angaben über die Organisation der Infusorien. Marburg: 8vo, 31 pp.

BRAUER, A. *Bursaria truncatella* unter Berücksichtigung anderer Heterotrichen und der Vorticellinen. Jen. Z. Nat. xix, pp. 489-518.

Structure of these forms. Contractility of freshwater *Vorticellinae* (with few exceptions) is seated in refractive, sharply-defined fibres, disposed at a blunt angle to cuticle. Details of the 'retrogressive metamorphoses' of encystation in *Bursaria*.

*BRAYLEY, E. B. Giant *Amæba*. Sci. Goss. 1836, p. 19.

An abnormal *Amæba*, $\frac{1}{5}$ -in. in length by $\frac{1}{15}$ -in. in breadth.

BURBACH, O. Beiträge zur Kenntniss der Foraminiferen der mittleren Lias am grossen Seeberge bei Gotha. Die Gattung *Frondicularia*, Defr. Z. Naturw. lix, pp. 30-53.

Detailed diagnoses of species.

— *Ibid.* p. 493, 1 pl. Die Milioliden, 4 n. sp.—*Opthalmidium orbiculare*, *Opthalmidium ovale* ; *Spiroloculina simplex*, *Spiroloculina latiseptata*.

BÜTSCHLI, O. Kleine Beiträge zur Kenntniss einiger mariner Rhizopoden. Morph. JB. xi, pp. 78-101, 2 pls.

A. Structure and distribution of nuclei in *Peneroplis pertusus* and *planatus*, *Orbitolites complanata*, *Lagena elegans*, *Textularia*, *Spirullina vivipara*, *Calcarina spengleri* and *Amphistegina lessonii*. B. Structure of the protoplasm; not a network, but honeycombed. c. Parasitic cells in *Orbitolites*, &c., comparable to 'yellow cells' of Radiolarians, &c. d. Other organisms found within these hosts.

— Bemerkungen zu der Schrift des Herrn Arnold Brass "Die Organisation der thierischen Zelle." T. c. pp. 229-242.

— Zur Morphologie der Vorticellinen. T. c. pp. 553-565; J. R. Micr. Soc. vi (4), pp. 632 & 633.

Morphological study of *Vorticellinae* and allies. Most primitive forms are *Urceolarina*, e. g., *Lionophora*, and those derivable from other *Ciliata*. The ciliated organ is the dorsal side, all the rest ventral ; and this explains anomalous (apparently longitudinal) division.

[BÜRSCHLI, O.] Bemerkungen über einen dem Glycogen verwandten Körper in den Gregarinen. Z. Biol. xxi, p. 603.

A substance (paraglycogen) closely related to glycogen demonstrated in Gregarines, and probably present in other *Protozoa*.

*CANAVARI, M. Di alcuni tipi di Foraminifere appartenenti alla famiglia delle *Nummulinidæ* raccolti nel Trias della Alpi Apuane. P.-v. Atti Soc. Tosc. v, pp. 184-187.

CANU, E. Sur le genre *Spirochona* (Stein). Bull. Sci. Nord. ix, pp. 21-13; J. R. Micr. Soc. vi (5), p. 460.

Spirochona crystallina, n. sp., found along with *Freyia limnoriae* and numerous *Peritricha* on marine Isopod *Limnoria*. *Spirochona* regarded as a peritrichous stage with homogeneous cilia amongst *Hypotricha*. *Oxytrichinidæ*, *Halteridæ*, and *Tintinnidæ* regarded as highly developed hypotrichous forms with a ciliated peristomial area.

CHAPMAN, F. [See SHERBORN.]

CROOKSHANK, E. M. Flagellated *Protozoa* in the Blood of Diseased and apparently Healthy Animals. J. R. Micr. Soc. 1886, pp. 913-929, 1 pl.

Notes on the "surra" parasite *Trichomonas evansi*, and other species, in fishes and mammals.

CUNNINGHAM, D. D. The Relation of Cholera to Schizomycete Organisms. Sci. Goss. 1886, pp. 163 & 164.

Aerial habits of *Euglenæ*, lying out of water supported by scum on tanks.

DADAY, E. v. Einiges ueber F. v. Stein's Cilioflagellatengattung *Cenchruidium*. Zool. Anz. ix, 213, pp. 15-19. [Cf. GRUBER, A., t. c. p. 200.]

Diagnosis and classification of *Cenchruidium*. *Cenchruidium* of Ehrenberg and Stein (= *Entosolenia*, Williamson), is not a cilioflagellate, but a Rhizopod of genus *Lagena*. This Gruber pointed out in 1884 (*loc. cit.* p. 200).

— Ein kleiner Beitrag zur Kenntniss der Infusorien-Fauna des Golfes von Neapel. MT. z. Stat. Neap. vi (4), 1886, pp. 481-498, 1 pl.

Description of: (fam. *Acineta*, Ehrbg.) *Acineta lividiana*, Mereschk, and *A. trinacria*, Gruber; (fam. *Trachelina*, St.) *Amphileptus gigas*, Clap. & Lach.; (Colepina, Ehrbg.), *Coleps fusus*, Clap. & Lach.; (fam. *Stentorina*, St.), *Stentor auricula*, S. Kent; (*Tintinnodea*, Clap. & Lach.), *Codonella orthoceras*, Hæck, *Dictyocysta mitra*, Hæck.

DALLINGER, W. H. Researches on the Cell Nucleus. J. R. Micr. Soc. vi, pp. 195-207, 3 pls.

Observations on structure and behaviour of nuclei—especially in *Tetramitus rostratus*, *Polytoma uvella*, *Heteromita rostrata*, and *Dallingeria drysdali*.

DANGEARD, P. A. Les organismes inférieurs. Ann. Sci. Nat. Bot. iv (1886), pp. 241-275, 2 pls.; J. R. Micr. Soc. Oct., 1887.

Heterophrys dispersa, n. sp.; intermediate between the *Nuclearia* and the *Heliozoa chlamydophora*. Green colour from food; very simple rupture-like division. A single nucleus. Encystation also observed. From study of *Actinophrys sol* arguments in favour of relationship of *Heliozoa* to *Vampyrella*, *Nuclearia*, *Heterophrys*. *Pseudopora volvocis*, Cnk., = new genus *Barbetia*, near *Heteromita*; *Vampyrella euglenæ*, n. sp.

DANILEWSKY, B. Zur Frage über die Identität der pathogenen Blutparasiten des Menschen und der Hæmatozoen der gesunden Tiere. CB. med. Wiss. xxiv, pp. 737-739 & 753-755.

Hypothesis that *Hæmatozoa* in malaria occur normally in blood of birds, &c.

—. Parasitologie du sang. Arch. slav. Biol. i, pp. 85-91 & 364-397; J. R. Micr. Soc. vi, pp. 635-637, 1006 & 1007, (1887), p. 603.

Description of *Sporozoa* and other parasites in blood of Vertebrates (*Hæmocytozoa*).

DEICHLER, — — —. Ueber parasitäre Protozoen im Keuchhustenauswurf. Z. wiss. Zool. xliii, p. 144.

EYFERTH, B. Die einfachsten Lebensformen des Thier- und Pflanzenreichs. Naturg. der mikr. Süsswasserbewohner. Braunschweig: Gœritz, 4to, 7 pls.

*FABRE DOMERGUE, —. Sur les corpuscules de la cavité générale du Siponcle. Bull. Sci. Nord. ix, pp. 359 & 360.

Infusorian parasite—*Pompholyxipia sipunculi*, n. g.

FISZER, Z. Observations sur la vacuole pulsatile des Infusoires. Arch. Slav. Biol. ii (1886), pp. 288 & 289; fr. Wszechswiat, 1885.

Description of contractile vacuoles of *Aspidisca lynceus* and *Paramœcium aurelia*. No definite membrane; surrounding fine canals; expulsion to exterior; pulsations quickened by deficient aeration.

FOLIN, M. DE. Sur les *Amphistegina* de Porto Grande. C.R. cii, pp. 1575 & 1576.

*FORNASINI, C. Foraminiferi illustrati da Soldani e citati degli autori, &c. Roma: 8vo, 126 pp.

FOULKE, S. G. An Endoparasite of *Noteus*. Ann. N. H. xvii, pp. 85 & 86; Am. J. Sci. 1885, p. 377.

Anoplophrya notei, n. sp.

FUCHS, R. Micromechanische Skizzen. Kosmos xviii, pp. 183-199, 285-302, & 416-441. (See General Part.)

*GARBINI, A. Psorosperms. Acc. Agr. Art. Comm. Verona, lxiii; J. R. Micr. Soc. iv, 1887, p. 605.

Granulations of protoplasm and nucleus not homogeneous.

GAULE, J. Bedeutung der Cytozoen. Biol. Centralbl. vi, pp. 345-351 ; Tag. Deut. Nat. Vers. 1885.

These elements not simply parasitic, but unite the constituents of other tissues, and, as fundamental elements, afford a key to understanding of organic structure.

GEDDES, P. Theory of Growth, Reproduction, Sex, and Heredity. P. R. Soc. Edinb. pp. 911-931.

The *Protozoa* are essentially protosperms and protova, exhibiting in their lines of differentiation and life-histories the outcome of preponderant or equated anabolism and katabolism, and in their incipient dimorphism the primitive expression and fundamental secret of sexual differences.

GOURRET, P., & RÆSER, P. Les Protozoaires du Vieux-Port de Marseille. Arch. Z. expér. iv, pp. 443-534, 8 pls. ; J. R. Micr. Soc. iii, 1887, pp. 415-417.

Faunistic, with description of new species in the above semi-marine habitat.

GRASSI, B. Protozoi parassiti delle Termiti. Bull. Soc. Ent. Ital. xvii, p. 358.

GREENWOOD, M. Digestive Process in some Rhizopods. J. Physiol. vii, pp. 253-273 ; J. R. Micr. Soc. 1887, pp. 251 & 252.

Notes on ingestion, changes, and digestion of food in *Amœba* and *Actinosphaerium*.

GRENFELL, J. G. Encystment of Infusorians. Sci. Goss. (1886), pp. 31-33 ; J. R. Micr. Soc. ii (2), p. 260.

Temporary encystment of Infusorians when attacked by *Sphaerophrya*.

GRUBER, A. Der Conjugationsprocess bei *Paramœcium aurelia*. Ber. Ges. Freib. i ; Ann. N. H. xviii (1886), pp. 164 & 165.

In *Paramœcium aurelia* the conjugation is associated with intermixture of nuclear substance ; the nucleoli also come together.

—. Mittheilungen über Protozoen Studien. Ber. Ges. Freib. i, Heft 2 ; Ann. N. H. xvii, pp. 473-494.

Physiology of *Protozoa*, especially *Stentor coerules*. Regeneration due to conversion of elemental parts by external irritation. The nucleus an essential species-preservative constituent. Spontaneous division, either at limit of growth, or in rapid succession with decrease of size in unfavourable conditions. The two daughter individuals not absolutely congruent. Diffuse nervosity, chiefly in cortex ; a single thread-like bridge of protoplasm, enough to cause a conjugating pair to make concordant movements.

—. Die Frage nach dem Bestehen verschiedener Plasmaschichten im Weichkörper der Rhizopoden. Biol. Centralbl. vi (1886), pp. 5-8.

The protoplasmic layers of Rhizopods are the artificial results of staining, or due to temporary aggregation of granules and vacuoles. Homo-

geneity especially manifest before division. Contact with water produces a certain stiffening of the plasma.

—. Die Protozoen des Hafens von Genoa. *Nova Acta Ac. L.-C.* Nat. cur. Bd. xlv, No. 4.

HÆCKEL, E. Das System der Acantharien. *SB. Jen. Ges.* (Nov., 1885), pp. 168-172 (see 1887).

*HAENSLER, R. Notes sur quelques Foraminifères des marnes à bryozoaires du Valanginien de Ste Croux. *Bull. Soc. Vand.* xxii, No. 95, pp. 260-266.

*HALLEZ, P. *Arcyothrix balbianii*, n. g. *Mém. Soc. Lille*, xvi; *Bull. Sci. Nord.* (1885); *Ann. N. H.* xvii, p. 539.

Presence of amœboid pseudopodia, and not Heliozoon-like filaments.

HARKER, A. On the Zoocytium or Gelatinous Matrix of *Ophrydium versatile*. *Rep. Brit. Ass.* (1885), pp. 1074 & 1075.

HEIDER, K. Zur metamorphose der *Oscarella lobularis*. *Arch. z. Inst. Wien*, vi.

Inter alia—discussion of relation of *Protozoa* and *Porifera* (see Sponges).

HOLMAN, L. E. Multiplication of *Amœbæ*. *P. Ac. Philad.* pp. 346-348; *J. R. Mic. Soc.* 1887, pp. 249 & 250.

Apparent case of conjugation and separation.

*HÜBNER, E. Englenaceen-Flora von Stralsund. *Prog. d. Realgymn. Stralsund.* Ostern. 1886, 4to.

4 new species.

IMHOF, O. E. Neue Resultate über der pelagische und Tiefsee Fauna einiger im Flussgebiet des Po gelegener Süßwasserbecken. *Zool. Anz.* ix, pp. 41-47.

*—. Ueber mikroskopische pelagische Thiere aus den Lagunen von Venedig. *T. c.* pp. 101-104. [Faunistic.]

—. Neue Resultate über mikroskopische pelagische Thiere aus dem Mittelmeer. *T. c.* pp. 198-200. [Faunistic.]

New pelagic species of *Cyttarocylis*—*C. adriatica*.

—. Ueber mikroskopische pelagische Thiere aus dem Ostsee. *T. c.* pp. 612-615.

JONES, T. RUPERT. Foraminifera. *P. Geol. Ass.* ix (1885-86), pp. 74 & 75.

—. The Origin and Constitution of Chalk and Flint, with special reference to their *Foraminifera*, and other minute organisms. *Tr. Hertf. Soc.* iii (1885-86), p. 143-165.

*KELLICOTT, D. S. Encystation of Infusorians. *The Microscope*, vi, pp. 53-58, 4 figs.; *J. R. Mic. Soc.* vi (4), p. 634.

"Protective" distinguished from "sporular" encystation. *Amphileptus meleagris* encysts on stalk of *Opercularia nutans* after devouring it, and divides into two ciliated daughter forms. Internal budding of *Podophrya quadripartita*.

*KERBERT, C. *Chromatophagus parasiticus*. Translated in Rep. U.S. Fish Comm. xii, p. 1127-1137.

*KHAWKINE, W. Sur le rôle de l'appareil buccal des Euglènes et des Astasies. Zapiski novoross. Obsch. xi, p. 57-74.

*KIRK, J. W. Some species of *Vorticella* from Wellington. Tr. N. Z. Inst. xviii.

Two new species figured.

KORSCHULT, E. Ueber die Theilbarkeit und das Regenerationsvermögen einzelliger Thiere. Kosmos xix, pp. 266-274.

Review of Grüber, Nussbaum, &c.

—. Ueber die geschlechtliche Fortpflanzung der Einzelligen und besonders der Infusorien. T. c. pp. 438-452.

Review of recent researches.

KRASSILTSCHIK, J. Ueber eine neue Flagellate *Cercobodo laciniægerens*, n. g. & sp. Zool. Anz. 9 Jahrg. No. 225, pp. 365-369, No. 226, pp. 394-399; J. R. Micr. Soc. vi, p. 1005; Zapiski novoross. Obsch. xi, pp. 211-245.

New Flagellate *Cercobodo laciniægerens*, in infusion of decaying leaves at Odessa, unites characters of *Cercomonadina* with those of *Bodonina*. Very small, mobile, with two cilia; resting stage with pseudopodia; feeds on *Bacteria*. The lowest of the *Bodonina*.

*KÜNSTLER, J. Les "yeux" des Infusoires flagellifères. J. Microgr. x, pp. 493-496.

*—. La Structure des Flagellés. Avignon: 8vo, 15 pp., 1 pl.

LANKESTER, E. R. *Chlamydomyxa* in the Engadine. Nature, xxxiv, pp. 408-409.

*LENDENFELD, R. v. *Amæba* infesting sheep. P. Linn. Soc. N.S.W. x (1885), pp. 35-38.

*—. Australian Fresh-Water Rhizopods. T. c. pp. 723-725; J. R. Micr. Soc. vi (5), p. 815.

Two new species, *Lieberkuenia australis* and *Echinopyxis australis*. No peculiar form.

LINDNER, —. Ueber eine neue Gattung von Peritrichen. Biol. Centralbl. vi, 23 (1887), pp. 733 & 734; J. R. Micr. Soc. 1887, pp. 253 & 254.

A parasitic peritrichous Infusorian, like an unstalked *Vorticella*, found abundantly in foul water, sewage fæces, and even urine of typhus-patients, and thriving in any medium where albuminoid material and no free acid. Longitudinal division, conjugation, encystation observed.

MASKELL, W. M. New Freshwater *Infusoria*. Tr. N. Z. Inst. xix, pp. 49-61, 2 pls.; J. R. Micr. Soc. v (1887), p. 767.

Infusoria of Wellington district.

*MAUPAS, E. Notes sur quelques Sporozoaires. Bull. Soc. méd. vétérin. 15 pp., 1 pl.

[MAUPAS, E]. Sur la conjugaison des Infusoires ciliés. C.R. cii (1886), pp. 1569-1572.

Conjugation of *Colpodium colpoda*, *Paramœcium aurelia*, *Euplotes patella* var. *eurystomus*. Seven stages in conjugating process; interchange of nucleolar corpuscles.

—. Sur les granules amyloacés du cytosome des Gregarines. T. c. pp. 120-123.

Characteristic amyloid granules in Gregarinids; definite in form; starchy in composition; arising in the middle of the protoplasm.

—. Sur la conjugaison des Paramécies. Op. cit. ciii (1886), pp. 482-484, 1 diagram.

In conjugation of *Paramœcia*, one of the division products of the hermaphrodite para-nucleus is specialized to form by division a fertilizing and a fertilized element, the former passing from one form to the other. The elimination of elements may be compared with phenomena of maturation, &c., in specialized sex-elements of *Metazoa*.

—. Sur la multiplication de la *Leucophrys patula*, Ehr. T. c. pp. 1270-1273.

Division at limit of growth. Voracious nutrition of *Leucophrys patula*, Ehr., associated with very rapid multiplication (32 descendants from 1 form in 24 hours). In scarcity of food encystation occurs, and rapid transverse division, forming small individuals. Many of these are devoured by surviving larger forms. The species may be preserved by this autophagy. Others escape, become quiescent, and with food acquire original characters of adult. No conjugation of small forms.

*MILLET, F. W. Additional notes on the *Foraminifera* of the St. Erth Clay. Tr. R. Geol. Soc. Cornw. x, pp. 222-226.

*MILNE, W. New Protozoa. P. Phil. Soc. Glasg. 1886, 1 pl.; J. R. Micr. Soc., June, 1887.

New Tentaculifer, *Stylostoma forrestii*, n. g. & sp., attached to a Cyclops: tentacles in groups at extremities of three arms. *Strombidinopsis proboscifer*, n. sp., *Oxytricha tricornis*, n. sp.

MÜBIUS, K. Adoral-Organ der Ciliaten. Ber. Deut. Nat. Vers.; Biol. Centralbl. vi (1886), pp. 539 & 540.

Adoral ciliated organ of heterotrichous and hypotrichous *Infusoria* shown to consist of fine cilia, united in comb-like plates. Also notes on multiplication of *Freia ampulla*, by unequal longitudinal division.

*MONIEZ, R. Note sur le genre *Gymnospora*, type nouveau de Sporozoaire. Bull. Soc. Z. Fr. xi, pp. 587-594, 10 figs.; J. R. Micr. Soc. ii (1887), p. 254.

Gymnospora nigra—probably one of *Coccidia*—in larva of *Vanessa urticae*.

[MONIEZ, R.]. Note sur une nouvelle forme de Sarcodine, le *Schizogenes parasiticus*. J. Anat. Phys. xxii, 6 (1886), pp. 515-523, 1 pl.

Unique parasitic species, provisionally ranked among Rhizopods, as a new family of *Sarcodina*; found in several *Ostracoda* and *Cladocera*, especially in *Cypris salina*. Body flattened, of variable form and size; protoplasm absolutely homogeneous, reproduction by indefinite fissures appearing anywhere, and constricting off independent masses.

*MURRAY, J. Report on the Specimens of Bottom Deposits 'Blake' Expedition. Bull. Mus. C. Z. xii, pp. 37-61 (Oct., 1885).

NUSSBAUM, M. Ueber die Theilbarkeit der lebendigen Materie. Die spontane und künstliche Theilung der Infusorien. Arch. mikr. Anat. xxvi (1886), pp. 485-538, 1 pl.; J. R. Micr. Soc. vi (2), p. 264.

Observations on spontaneous and artificial division; structure and history of *Opalina ranarum* and *Gastrostyla vorax*; nucleus and protoplasm can only exist in conjunction; generalizations on cellular physiology.

*OLLIVIER, G. Physiologie du *Protamoeba primitiva*; insuffisance des explications physico-chimiques en biologie. Extr. de l'Union méd. et sci. Nord-Est. Reims: Matol-Braine, 32 pp.

PACHINGER, A. Mittheilung über Sporozoen; Zool. Anz. ix, pp. 471 & 472. Nehány adat a Sporozoák természetéről jához. Kolozsivárt: 1886, 8vo, 18 pp.

Eimeria falciformis destroying kidneys of horse; a new form in alimentary canal of cat; a third, *Molybdis entzii*, n. sp.?, in small intestine of *Rana esculenta*.

PARONA, C. Protisti parassiti nella *Ciona intestinalis*, L. Atti Soc. Ital. xxix; J. Microgr. x, pp. 496-501, 1 pl.; J. R. Micr. Soc. 1887, pp. 419 & 420.

Structure of *Urospora cionæ* (in Schneider's genus *Urospora*, but probably identical with Frenzel's *Gregarina cionæ*). Parasitic in intestine and stomach of *Cione intestinalis*. Characteristic caudal appendages.

PATTEN, W. On the Eyes of *Mollusca* and *Arthropods*. MT. z. Stat. Neap. vi, pp. 542-756, 5 pls.

Inter alia—notes on origin of eyes in *Protozoa*, and their original trophic (heliophagous) function.

*PERÉIASLAVTZEVA, B. Protozoen des Schwarzen Meers. Schr. Nat. Ges. Odessa x, Heft. 2, 3 pls.; Arch. Slav. Biol. iv, 1 (1887), p. 116.

List of 100 species, 18 new species, with figs; geographical laws of Merejkowski refuted.

PFITZNER, W. Zur Kenntniss der Kerntheilung bei der Protozoen. Morph. JB. xi, pp. 454-467, 1 pl.

In *Opalina* nuclei occur exactly similar to the resting or dividing nuclei of *Metazoa*. Besides these, there also occur only structures which have no resemblance to the nuclei of *Metazoan* cells. The nuclei of *Opalina* multiply solely by karyokinesis.

*PLATE, L. Ueber die Conjugation der Infusorien. SB. Ges. Münch. ii, pp. 35-37.

——. Ueber einiger an den Kiemenblättern des *Gammarus pulex* lebenden Ectoparasiten. Z. wiss. Zool. xliii, pp. 175-241, 2 pls.; J. R. Micr. Soc. vi, pp. 771-773.

Structure and history of parasites on gills of *Gammarus pulex*—*Dendrocometes paradoxus*, *Spirochona gemmipara*, *Lagenophrys ampulla*, with general notes on conjugation, &c.

POUCHET, G. Sur *Gymnodinium polyphemus*, P. C.R. ciii (1886), pp. 801-803.

Gymnodinium polyphemus, n. sp., possesses complex eye, with transparent highly refractive lens embedded in red or black pigment. Both "lens" and "choroid" formed from concentration of elements distinct at earlier stage.

*RAILLIET, A., & MOULÉ, L. Notes sur quelques Sporozoaires. Bull. Soc. Méd. vétérin. 15 pp., 1 pl.

ROBOZ, Z. v. Beiträge zur Kenntniss der Gregarinen. Math. Nat. Ber. Ung. iv, pp. 146 & 147; J. R. Micr. Soc. v (1887), pp. 769 & 770.

Gregarina flava, n. sp. in *Salpa bicaudata*. Three separate divisions in body. Longitudinal and transverse muscular fibres. Pores in cuticle. Partitions from continuation inwards of cuticle. Karyokinetic changes in nucleus. Details of conjugation.

RÆSER, P. [See GOURRET, P.]

ROSSETER, T. B. On *Trichodina* as an Endoparasite. J. R. Micr. Soc. 1886, pp. 929-933, 1 pl.

New species in *Triton* (urinogenital organs).

RZEHAK. Bemerkungen über einige Foraminiferen d. Oligocänformat. Verh. Ver. Brünn, xxiii.

SALENSKY, W. Die Urform der Heteroplastiden. Biol. Centralbl. vi (17), pp. 514-525.

Primitive form of *Heteroplastid*, a spherical colony of Flagellates, vegetating and reproducing like *Volvox*. Some reproductive cells become endoderm, genitocœl becomes a phagogenitocœl, and a genitogastrula arises. The archenteron of *Metazoa* is homologue of genitocœl. The blastocœl is a new formation. The blastopore is the primitive aperture of the *Volvox* colony. Different forms of blastula are not homologous; schizoblastulæ nearest primitive type; gastroblastulæ have arisen by acceleration of differentiating process.

*SCHNEIDER, A. Fragments sur les Infusoires. Tablett. Zool. i, pp. 82-87, 4 pls.

*——. *Anoplophrya circulans*. T. c. pp. 73-80.

*[SCHNEIDER, A.] Études sur le développement des Grégarines, &c. *T. c.* pp. 81, 88, 89, & 90-103.

SCHNEIDER, R. Amphibisches Leben in den Rhizomorphen bei Burgk. SB. Ak. Berlin, xxxix (1886), pp. 883-900, 1 pl.

Among mycelia of *Rhizomorpha subterranea* in damp grotto; 51 forms, of which 24 are *Protozoa*.

SCHUBERG. Ueber den Bau d. *Bursaria truncatella*. Morph. JB. xii (3), 2 pls.

SCHULZE, F. E. Zur Lähmung, &c., von Tieren. Ber. Deut. Nat. Vers.; Biol. Centralbl. vi (24).

Method of treating *Protozoa*.

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*SPENCER, J. *Zoothamnium arbuscula*. J. Quek. Club, iii, pp. 5-7, 1 pl.; J. R. Micr. Soc. (1887), p. 253.

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5 new genera and 14 new species.

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New genera—*Hemicyclostyla*, *Eschaneustyla*, *Platytrichotus*.

—. Notices of New Freshwater *Infusoria*. Op. cit. xxiii, pp. 562-568; J. R. Micr. Soc., June, 1887, p. 418.

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Opalina spiculata, n. sp.; most closely allied to *O. prolifera* and *O. uncinata*; in coelom of young earthworm; with a long spicule.

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GENERAL.

Evolution of micro-organisms (Balbiani).

General notes on morphology and physiology (Berthold, G.).

Fresh-water Protists (Blochmann, F.).

General notes on structure; criticism of Brass (Bütschli, O.).

Relations of *Protozoa* and *Protophyta* (Dangeard, P. A.).

Theory of *Protozoa* (Geddes, P.).

Freshwater *Protozoa* (Eyferth, B.).

Relation of *Protozoa* to *Porifera* (Heider, K.).

Phylogeny of Heteroplastids from *Volvox*-like colony (Salensky, W.).

STRUCTURE.

[See Cell.]

Structure of *Infusoria* (Brass, A.).

Contractile muscle-fibres of *Vorticellinae* (Brauer, A.).

Rhizopoda. Structure and distribution of nuclei; structure of the protoplasm (Bütschli, O.).

Structure of contractile vacuoles (Fischer, Z.).

Protozoa without nuclei (Gruber, A.).

Protoplasmic layers in *Rhizopods* either artificial or physical (Gruber, A.).

Structure of Flagellates—"eyes," &c. (Künstler, J.).

Adoral organ formed of cilia united in comb-like plates (Möbius, K.).

Structure and phenomena of division in *Opalina* and *Gastrostyla*; (Nussbaum, M.).

Details of nuclear changes in dividing *Opalina* (Pfitzner, W.).

Eye with true crystalline and choroid portion in *Gymnodinium polyphemus*, P. (Pouchet, G.).

Longitudinal and transverse muscular fibres which could be isolated in cortical layer of *Gregarina flava* (Roboz, Z. v.).

Nucleus of *Rhizopods* rendered visible by weak discharge from single small Leyden jar (Wallich, G. C.).

PHYSIOLOGY.

[See Protoplasm.]

General Physiology, *e. g.*, of internal movements (Berthold, G.).

Spherozoa. Nutritive function of symbions; movement; relation to environment—salinity, &c.; phosphorescence in oil globules, &c. (Brandt, K.).

Contractility and encystation of *Bursaria truncatella*, &c. (Brauer, A.).

Rhizopoda. "Parasitic" cells in Orbitolites, &c., comparable to "yellow cells"; other partner organisms (Bütschli, O.).

Paraglycogen in Gregarines (Bütschli, O.).

Euglenæ. Brick-red in morning, vivid green in evening, depending upon alterations in amount and abundance of red, oily pigment (Cunningham, D. D.).

In *Cenchridium* the contained *Algæ* are not nutriment, but representatives of Brandt's *Zooxanthellæ* (Daday, E. v.).

Difference between intracellular digestion of *Protozoa* and that of *Protophyta* (Dangeard, P. A.).

Activity of contractile vacuoles (Fischer, Z.).

Ultimate physiology of movement, ingestion, &c., of *Protozoa* investigated on mathematical lines as problems in molecular dynamics (Fuchs, K.).

Digestion in *Amæba* and *Actinosphærium*; direct contact with protoplasm said not to be necessary (Greenwood, M.).

Temporary encystment on attack (Grenfell, J. G.).

Nervous system of Infusorians (Gruber, A.).

Regeneration (Gruber, A.).

Encystation "protective" distinguished from "duplicative" or "sporular" (Kellicott, D. S.).

Roll of buccal apparatus of *Euglenæ* and *Astasiæ* (Khawkin, W.).

Division and regeneration (Korschelt, E.).

Zoo-amylum granules occurring in definite form in protoplasm of Gregarinids (Maupas, E.).

Relation between reproduction and nutrition (Maupas, E.).

Division, regeneration, and general notes on cellular physiology (Nussbaum, M.).

Protamæba primitiva (Ollivier, G.).

Heliophagous function of "eyes" (Patten, W.).

Subterranean Protozoa (Schneider, R.).

Relation of flagellate forms to mode of life and environment; frequent degeneration of flagella, no contractile vacuoles in parasitic and marine forms (Seligo, A.).

Petalomonas: food-habit (Stokes, A. C.).

REPRODUCTION.

[See General Subjects.]

Division of Dinoflagellates (Bergh, R. S.).

Reproduction in *Spherozoa* (a) by division of colony, (b) by division of individuals, (c) by swarm spores (iso- and aniso-, with alternation of generations [?]), (d) by budding off of "extra capsular bodies" (Brandt, K.).

Lagenophrys. Division (Butschli, O.).

Monads. Reproduction (Dallinger, W. H.).

Simple rupture-like division of *Heterophrys dispersa* (Dangeard, P. A.).

Theory of reproduction (Geddes, P.).

Conjugation of *Paramecium aurelia* = intimate intermixture; the nucleoli copulate with each other (Gruber, A.).

Apparent conjugation of *Amæba* (Holman, L. E.).

Reproduction of *Infusoria*, &c. (Korschelt, E.).

Ciliate Infusorians (*Colpodium*, *Paramecium*, *Euplotes*), (Maupas, E.); interchange of nucleolar corpuscles in conjugation.

Paramecium: conjugation really sexual; systematic review of phenomena (Maupas, E.).

Schizogenes parasiticus, n. g. (Moniez, R.). Reproduction by fissures in homogeneous protoplasm, appearing anywhere, and constricting off independent daughter masses.

Conjugation of Infusorians (Plate, L). Object: the restoration of balance between cyto- and nucleio-idioplasm. Supposition that the idioplasm of cell passes into that of nucleus. Conjugation epidemic, possibly due to sudden alteration in external relations.

In *Gregarina flava*, n. sp., division of nucleus, formation of asters, fusion of conjugating individuals, expulsion of polar elements, formation of new nucleus observed (Roboz, Z. v.).

Zoothamnium arbuscula; separation of reproductive zooids (Spencer, J.).

Division of Rhizopods (Wallich, G. C.).

PARASITIC.

Amæba, like *A. limax*, parasitic on *Hæmatococcus bütschli* (Blochmann, F.).

New genus parasitic Infusorians (Braun, M.).

Flagellates in blood of diseased and apparently healthy animals (Crookshank, E. M.).

Isomastigod Flagellate like *Hexamitus* (Duj.), in *Emys* and *Rana*; (Danilewsky, B.).

Hæmatozoa of various animals (Danilewsky, B.).

Protozoa in sputa (Deichler).

Pompholyxia, n. g., parasitic in *Sipunculus* (Fabre-Domergue).

Anoplophrya notei, n. sp., in *Rotifer noteus* (Foulke, S. G.).

In *Termites* (Grassi, B.).

Chromatophagus parasiticus (Kerbert, C.).

Amæba in sheep (Lendenfeld, R. v.).

An ascoid peritrichous Infusorian, *Vorticella*-like, in typhus-patients, in swine, sewage, &c. (Lindner).

Schizogenes parasiticus, unique form of *Sarcodina*, parasitic in visceral cavity of several *Ostracoda* and *Cladocera*, especially in *Cyprus salina* (Moniez, R.).

Parasites of *Ciona intestinalis*, L. (Parona, C.).

Lagenophrys ampulla—gills of *Gammarus* (Plate, L.).

Spirochona gemmipara on gills of *Gammarus pulex* (Plate, L.).

Dendrocometes paradoxus, Acinetid parasite on gills of *Gammarus pulex* (Plate, L.).

Polycystid Gregarines in intestine and body-cavity of *Gammarus pulex* (Plate, L.).

Trichodina, n. sp., in urinogenital organs of *Triton* (Rosseter, T. B.).

In Cyprids (Stuhlmann, F.).

Colonies of *Myxosphera carulea* frequently contained a parasitic amphipod *Hyperia*; also Copepods and *Appendiculariæ*.

DISTRIBUTION AND FAUNISTIC.

Swiss lakes, &c. (Asper, G., and Asper, G., & Heuscher, J.).

Deep-lake Foraminifer (Blanc, H.).

Sphærozoa of Gulf of Naples (Brandt, K.).

Infusoria of Naples Bay (Daday, E. v.).

Infusoria of semi-marine Vieux Port de Marseille (Gouret, P., & Roeser, P.).

Baltic (Imhof, O. E.).

Freshwater basins of Po (Imhof, O. E.).

Mediterranean forms (Imhof, O. E.).

Venetian lagoons (Imhof, O. E.).

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- Chlamydomyxa* in Engadine (Lankester, E. R.).
 Australian Rhizopods. No peculiar form. 2 new species (Lendenfeld, R. v.).
 Freshwater *Infusoria* of Wellington (Maskell, W. M.).
 Bottom deposits (Murray, J.).
 Black Sea. Laws of Merejkowski refuted (Peréaslavtzeva, B.).
Foraminifera of Liverpool Bay (Siddall, J. D.).
Foraminifera of Norwegian Coast (Terquem, O. & E.).
 Polar *Foraminifera* (Uhlig, V.).
 North German Lakes (Zacharias, O.).

PALEONTOLOGICAL.

- Orbitolites italica*, Costa sp. (Brady, H. B.).
Foraminifera of Middle Lias; *Fronicularia* (Burbach, G. O.).
 Nummulinid *Foraminifera* from Trias (Canavari, M.).
Foraminifera, (Fornasini, C.).
Foraminifera (Jones, T. Rupert).
Foraminifera (Millet, F. W.).
 List of *Foraminifera* in London Clay (Sherborn, C. D., & Chapman, F.).
 Fuller's-earth of Warsaw (Terquem, M. O.).
Foraminifera (Vine, G. R.).

A.—GYMNOMYXA.

I.—PROTEOMYXA.

- Relations of *Proteomyxa* to other *Protozoa* and to *Protophyta*. *Vampyrella euglenæ*, n. sp. Relations, encystation, and nutrition of *Vampyrella*. (Dangeard, P. A.)
Protamæba primitiva, physiology (Ollivier, G.).

II.—LOBOSA.

- Pelomyxa palustris*, internal movements rationalised (Berthold, G.).
Amæba proteus abnormally large (Brayley, E. B.).
Arcyothrix balbianii, n. g., with amœboid pseudopodium and two Heliozoon-like filaments (Hallez, P.).
 Multiplication of *Amæba* (Holman, L. E.).
Echinopyxis australis, n. sp., Australia, Botany Swamps (Lendenfeld, R. v.).
Lieberkuenia australis, n. sp. (Lendenfeld, R. v.).
 Rhizopods: endogenous division (Wallich, G. C.).

III.—LABYRINTHULIDEA.

- Chlamydomyxa* (Lankester, E. R.).

IV.—HELIOZOA.

- Actinophrys sol*, development and relations (Dangeard, P. A.).

Heterophrys dispersa, n. sp., between *Nuclearia* and *Heliozoa Chlamydo-*
phora. *Vampyrella euglenæ*, n. sp. *Pseudospora volvocis*, Cuk., = n. g.
Barbetia. (Dangeard, P. A.).

V.—RETICULARIA.

- Gromia brunneri*, n. sp. (Blanc, H.).
Orbitolites italica, Costa sp. (= *O. tenuissima*, Carpenter) (Brady,
H. B.).
Amphistegina (Folin, M. de).
Foraminifera (Haensler, R.).
Miliolina spiculifera, n. sp., *Reophax moniliformis*, n. sp., *Placopsilina*
kingsleyi, n. sp. (Siddall, J. D.).
Foraminifera (Rzehak.).
Adelosina, morphology of chambers (Schlumberger, C.).
Foraminifera of Norwegian coast (Terquem, O. & E.).
Foraminifera, Polar (Uhlig, V.).

VI.—RADIOLARIA.

Sphærozoa:—I. *Sphærozoida*: (a) *Collozoum, inerme*, Müll. sp., *fulvum*,
n. sp., *pelagicum*, Hkl., *hertwigii*, n. sp.; (b) *Sphærozoum, punctatum*,
Huxl. sp., *neapolitana*, Brandt, *acuferum*, Müll., *hæckeli*, n. sp., *spinulosum*,
Müll. II. *Collosphærida*: (c) *Myxosphæra*, n. g., *M. cærulea*, Hkl. sp.;
(d) *Collosphæra*, Müll., *huxleyi*, Müll.; (e) *Acrosphæra*, Hkl., *spinosa*,
Hkl.; (f) *Siphonosphæra*, Müll., *tubulosa*, Müll., *tenera*, n. sp.

Life-history. Development of *Sphærozoa*—five phases: (1), swarm-
spore; (2) young vegetative phase; (3) young reproductive phase, with
formation of extra-capsular bodies; (4) older vegetative phase; (5) older
reproductive phase, with isospores and anisospores. (Brandt, K.).

Myxosphæra, n. g. (Brandt, K.).

Acantharia, systematic classification (Hæckel, E.).

Sarcodina in sputa (Deichler).

Sarcodina fam.: *Schizogenes parasiticus*, n. g. (Moniez, R.).

Rhizopoda (F. E. Schulze): method.

B.—CORTICATA.

VII.—SPOROZOA.

Paraglycogen in Gregarines (Bütschli, O.).

Hæmocytozoa normal in healthy animals, pathological in blood of man
(Danilewsky, B.).

Sporozoa in blood (Danilewsky, B.).

Hæmatozoa lacerte, several forms in red blood corpuscles of lizards,
resembling *Hæmogregarina testudinis* (Danilewsky, B.).

Psorosperms, structure of (Garbini, A.).

Amyloid granules (Maupas, E.).

Gymnospora, new type (Moniez, R.).

Eimeria falciformis (horse), *Molybdia entzii*, n. sp. (frog) (Pachinger, A.)

Urospora cionæ (Gregarine) parasitic in stomach and intestine of *Cione*
intestinalis (Parona, C.).

Notes on (Railliet, A., & Moulé, L.).

Minute structure and reproduction (Roboz, Z. v.).

Development (Schneider, A.).

VIII-XI.—INFUSORIA.

General.

Infusoria, structure of (Brass, A.).

New parasitic genus (Braun, M.).

Infusoria of Naples Bay (Daday, E. v.).

Pompholyxia, n. g., Infusorian parasite in *Sipunculus* (Fabre-Domergue).

Multiplication and regeneration (Korschelt, E.).

Infusoria, notes on (Schneider, A.).

Method of treating *Infusoria* (Schulze, F. E.).

New *Infusoria* (Stokes, A. C.).

VIII. FLAGELLATA.

Cenchridium a Rhizopod, not a Cilioflagellate (Daday, E. v.).

Diagnosis and synonyms of *Cenchridium*:—Fam. *Rhabdoina*, Gen., *Lagena*, Walcker & Jacobs. Syn., *Cenchridium*, Ehrbg., *Entosolenia*, Will., *Cenchridium*, Stein. Species, *Lagena globulosa*, Will., *L. spherula*, Ehrbg., *L. rugulosa*, Stein, *L. tridactyla*, Stein (Daday, E. v.).

Flagellata: eyes (Künstler, J.).

Flagellata: theoretical importance of Flagellate colonies (Salensky, W.).

Trentonia, n. g., *Cyclonexis*, n. g., *C. annularis*, n. sp., *Anisonema pusilla*, n. sp., *Cryptoglana truncata*, n. sp., *Physomonas elongata*, n. sp., *Urceolus subulosus*, n. sp., *Perispira strophosoma*, n. sp., *Trachelophyllum clavatum*, n. sp., *Chrysopyxis triangularis*, *C. macrotrachela*, *C. ampullacea*, n. spp., *Strombidinopsis acuminata*, n. sp. (Stokes, A. C.).

Strombidinopsis proboscidiifer, n. sp. (Milne, W.).

LISSOFLAGELLATA.

System of Flagellates:—

I. *Amæbomastigoda* (Monadina), *Mono-*, *Hetero-*, and *Poly-mastigoda*.

II. *Choanomastigoda*.

III. *Phytomastigoda* (*Volvocina*, in widest sense).

IV. *Ochetomastigoda* (*Arthrodelæ*).

V. *Stomatomastigoda* (*Euglenoidina*), *Astasiæ*, and *Anisonemina* (Seligo, A.).

Bodo limbatus, n. sp. (*Heteromastigoda*); *Gyromonas ambulans*, n. g. (*Perymastigoda*); *Glenodinium cohnii*, n. sp. (*Ochetomastigoda*).

Distinction and description of the Monadina parasites, *Hexamitis intestinalis*, *Trichomonas batrachorum*, and *Bodo lucertæ*. (Seligo, A.)

1. MONADIDEA.

Structure of Monads (Dallinger, W. H.).

Cercomonas grandis, n. sp. (Maskell, W. M.).

Mastigamæba, n. sp., *Clostonema*, n. g., *Paramonas alata*, n. sp. (Stokes, A. C.).

Trentonia flagellata, n. sp., &c. (Stokes, A. C.).

2. EUGLENOIDEA.

Euglenæ æreal rather than aquatic, supported above water of tanks (Calcutta) by floating scum (Cunningham, D. D.).

Euglenaceæ (Hübner, E.).

Buccal apparatus of *Euglenæ* and *Astasiæ* (Khawkinge, W.).

Trachelomonas crenilaticollis, n. sp. (Maskell, W. M.).

Laguncula piscatoris, Fisher, is a species of *Trachelomonas*—*T. piscatoris* (Stokes, A. C.).

Cyclanura, n. g. (Stokes, A. C.).

3. HETEROMASTIGODA.

Cercobodo laciniaegerens, n. g. & sp., lowest of *Bodonina* (Krassiltschik, J.).

Heteromita variabilis, &c., n. sp. (Stokes, A. C.).

4. ISOMASTIGODA.

Infusoria. Flagellate *Protozoa* in blood. Genus, *Trichomonas*; subgenus, *T. sanguinis*: elongated, tapering, polymorphic, with spiral or longitudinal membrane, terminating in a rigid filament, and an anterior flagellum. Species: *T. cobitis* (*Hæmatomonas cobitis*, Mitrophanow), in mud-fish; *T. carassii* (*H. carassii*, Mitr.), in carp; *T. lewisi* (*Herpetomonas lewisi*, Kent), in rat and hamster; *T. evansi* (*Spirochæta evansi*, Steel), in horse, mule, camel (pathogenic). (Crookshank, E. M.).

Isomastigod nomad parasite (*Hexamitus*) in *Eurydes* and *Rana* (Danilewsky, B.).

Hæmatococcus bütschli, n. sp.

Tetramitus variabilis, n. sp. (Stokes, A. C.).

CHOANOFLAGELLATA.

Monosiga limnobia, n. sp., equatorial contractile vacuoles; *Salpingæca eurystoma*, n. sp., wide mouth and everted edge of lorica; *Desmarella irregularis*, n. sp., colonies of 50 or more, food ingested at external base of collar, on which the currents are reversed (Stokes, A. C.).

IX.—DINOFLAGELLATA.

DINIFERA.

Dinoflagellata, division (Bergh, R. S.).

Gymnodinium polyphemus, P.: its eye (Pouchet, G.).

Peridinium, structure (Stokes, A. C.).

X.—CILIATA.

Affinities between *Ciliata* (Canu, E.).

1. PERITRICHÆ.

Origin and morphology of *Vorticellinæ*. Ciliated organ dorsal. (Bütschli, O.)

Vorticellidæ: *V. plicata*, *V. anomala*, n. spp. *Zoothamnium plicatum*,

Epistylis barbata, *Cothurnia fusiformis*, *C. striata*, n. spp. (Gourret, P., & Roeser, P.).

Ophrydium, gelatinous matrix (Harker, H.).

Vorticella brevistyla, d'Udekem, = *V. rhabdostyloides*, Kell, = *Spastostyla sertularium* (upper part of stalk flexible, Entz.). (Kellicott, D. S.).

Vorticella, two new species (Kirk, J. W.).

New Ascoid, *Vorticella*-like, peritrichous, parasitic Infusorian (Lindner).

Licnophora setifera, n. sp. (Maskell, W. M.).

Opercularia parallela, n. sp. (Maskell, W. M.).

Adoral organ of *Ciliata* (Möbius, K.).

Spirochona gemmipara, conjugation (Plate, L.).

Lagenophrys ampulla, structure and reproduction (Plate, L.).

Zoothamnium arbuscula (Spencer, J.).

Vorticella floridensis, n. sp., Campanulate variable body. *Cothurnia canthocampi*, n. sp. (Stokes, A. C.).

Balanitozoon, n. g., connects *Holotricha* with *Peritricha*. *Vorticella lemnae*, n. sp. *Uroleptus sphagni*, n. sp. *Rhabdostyla pusilla*, n. sp. *Vaginicola ampulla*, n. sp. (Stokes, A. C.).

Opisthostyla, n. g., including *Rhabdostyla pusilla*, and *C. annulata*, n. sp. *Metopides acuminata*, n. sp. *Rhabdostyla invaginata*, n. sp. *Pyxidium urceolatum*, n. sp. (Stokes, A. C.).

2. HETEROTRICHIA.

Bursaria truncatella, its structure and encystation (Brauer, A.).

Fam., *Tintinnodea*, Clap. & Lachm.; *Codonella punctata*, n. sp., *C. annulata*, n. sp., *Dictyocysta ovalis*, n. sp. (Daday, E. v.).

Condylostoma patens, detailed account (Gourret, P., and Roeser, P.).

Stentor ceruleus, physiology of regeneration, division, congregation (Gruber, A.).

Stentor gracilis, n. sp. (Maskell, W. M.).

Freia ampulla, multiplication (Möbius, K.).

Trichodina, n. sp., in urinogenital organs of *Triton* (Rosseter, T. B.).

Bursaria truncatella, structure (Schuberg).

Histiobalantidium, n. g. (Stokes, A. C.); heterotrichous, between Kent's *Spirostomidae* and Stein's *Bursaridae*.

3. HOLOTRICHIA.

Fam. *Enchelina*, St.: *Holophrya maxima*, n. sp., *Lagynus ocellatus*, n. sp. (Daday, E. v.).

Structure of *Paramæcium* (Fischer, Z.).

Anoplophrya notei, n. sp., parasitic in *Rotifer noteus* (Foulke, S. G.).

Paramécidae: *P. pyriforme*, n. sp. *Trachelophyllidae*: *Enchelyodon striatus*, n. sp. *Trachelidae*: *Amphileptus lacazei*, n. sp., *A. massiliensis*, n. sp., *Loxophyllum pyriforme*, n. sp. *Ophryoglenidae*: *Lembadion ovale*, n. sp. *Lembidae*: *L. intermedius*, n. sp. (Gourret, P., & Roeser, P.).

Paramæcium aurelia, conjugation (Gruber, A.).

Prorodon sulcatus, n. sp. *Tillina enormis*, n. sp., and *T. inaequalis*, n. sp. (Maskell, W. M.).

Trachelocerca filiformis, n. sp., *Plagiopyla varians*, n. sp., *Pleuronema cyclidium*, n. sp. (Maskell, W. M.).

Colpodium, *Paramœcium*, *Euplotes* (Maupas, E.) ; description of conjugation.

Leucophrys patula, Ehr. : its modes of multiplication (Maupas, E.).

Opalina ranarum and *Gastrostyla vorax*, structure and history (Nassbaum, M.).

Opalina: nuclei multiplying only by karyokinesis, and exactly similar in structure to Metazoan nuclei (Pitzner, W.).

Lacrymaria teres, n. sp., *Prorodon limnetis*, n. sp., *Leucophrys curvilata*, n. sp. (Stokes, A. G.).

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Colpoda depressa, n. sp. (Stokes, A. C.).

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Histrio acuminatus, n. sp. (Maskell, W. M.).

Oxytricha tricornis, n. sp. (Milne, W.).

Platytrichotus, n. g., connecting *Holosticha* and *Uroleptus*; *P. opisthobolus*, n. sp. *Eschaneustyla*, n. g., like *Urostyla*; *E. brachytoma*, n. sp. *Uroleptus dispar* and *U. caudatus*, n. spp. *Holosticha caudata*, *hymenophora*, and *similis*, n. spp. *Urostyla caudata*, n. sp. *Hemicyclostyla*, n. g., with twenty or more frontal styles, no anal styles, multiple nucleus; *H. sphagni*, n. sp., and *H. trichota*, n. sp. (Stokes, A. C.)

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Sphærophryidæ: *Sphærophrya massiliensis*, n. sp. (Gourret, P., & Rœser, P.).

Acineta elegans, n. sp., *A. simplex*, n. sp. (Maskell, W. M.).

Tentaculifera: *Stylostoma forrestii*, n. g. & sp., marine, attached to *Cyclops*; capitate tentacles in groups at ends of three arms (Milne, W.).

Dendrocometes paradoxus, structure and life-history (Plate, L.).

Classification of *Acinetidæ* (Plate, L.): I. *Fasciculifera* (*Ophryodendron* and *Dendrocometes*); II. *Radiformia* (*Sphærophrya*, *Podophrya*, *Acineta*, *Dendrosoma*, and *Urnula*).

Acinetactis mirabilis, n. g. & sp., 2 flagella and capitate pseudopodia. New family *Acinetactidæ*. *Acineta lacustris*, n. sp. (*Anacharis*), and *A. stagnalis*, n. sp. (*Myriophyllum*). *Trichophrya sinuosa*, n. sp. (Stokes, A. C.)

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in Zoology.]

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